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STUDIES IN MEDICAL SOCIOLOGY

II. The Relation of Mental Disorders to Population Density

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BOSTON

IN THE preceding study showing the relation of mental disorders to community socioeconomic level, variations in the rates of certain mental disorders were attributed to differences in population density. The purpose of the present study is to show these variations and to present possible explanations. Although there has been extensive investigation of rural-urban differences,[1, 2] there has been no psychiatric study of an unselected cross section of the population. Previous work has usually been based on mental-hospital admissions and delinquency rates. Studies of this type do not eliminate the selective factor involved in local differences in attitude toward hospitalization and law enforcement.

Another weakness of rural and urban studies is the failure to make any correction in the findings for differences in socioeconomic level; hence, it has been difficult to isolate the rural-urban differences that are due to the differences in population density per se and not to the differences in economic level.

The examination of men coming to the Boston Armed Forces Induction Station from both rural and urban communities offers an excellent opportunity for the study of an unselected group of the male population. The communities sending selectees here have been classified regarding index of socioeconomic level according to grades of desirability, explained in more detail in other studies.[3, 4] Since the relation of mental disorders to desirability level has been demonstrated,[4] it is possible to make a correction for that factor and hence to approach the relation between mental disorders and population density.

One of the most significant studies of the relation of mental disorders to population density is that of Dayton,[5] who found that, although 7.6 per cent of the population of Massachusetts is rural, only 3.9 per cent of first hospital admissions for mental diseases in Massachusetts were from rural environments. Mental disorders in patients from rural environment were largely those associated with physical conditions, — namely, senile psychoses, mental deficiency, Huntington's chorea, somatic disease and arteriosclerosis, — whereas the most frequent abnormalities from the urban communities were paranoia, manic-depressive psychoses and psychoneurosis.

Shaw et al.[6] found that delinquency rates dropped rapidly from the densest center of Chicago toward the least dense periphery, regardless of the nationality at the center, and like findings have been shown for Boston by the Boston Council of Social Agencies.[7] In the examination of men drafted in World War I, mental deficiency was seen to be highest in rural areas, and other mental and nervous disorders and chronic alcoholism were higher in urban areas.[8] These latter findings, although highly significant, are based on a far less extensive psychiatric examination than that done for the induction of men into the armed forces in World War II.

METHOD OF STUDY

The present study considers the same men as did that of the previous study of socioeconomic level, namely, those selectees from the eastern segment of Massachusetts examined at the Boston Induction Station during the winter, spring and summer months of 1941 and 1942.

The area includes a population distribution that is densest in Boston and includes 4 other cities of over 100,000 population, 5 with more than 50,000, 9 with more than 25,000 and over 50 towns and villages each with a population less than 2000. The sparsely populated areas represented are those of Cape Cod, the region inland from the southern coastal cities of New Bedford and Fall River and the region above the large cities immediately north of Boston.

Although the population is predominantly urban, the rural population is sufficient to be of significance. It is difficult to obtain any greater diversity of population densities than is present here and at

the same time to have all selectees examined at the same induction station, by the same criteria and by the same team of examiners. Because of the uniformity of the examinations on which the present study is based, it is possible to avoid the criticism made in connection with the World War I study of rural-urban comparisons that a large part of the differences is probably due to the more critical examinations made by the physical examiners in the large cities.[9]

Although the rating of density according to population per square mile does not always indicate the extent of overcrowding because of the occasional presence of densely populated and sparsely populated areas within the same community, it serves the purpose of a community study of this type. A more intensive study of density would take into consideration the average number of people per room and the proportion of uninhabitable land in any area.

In order to interpret properly the significance of our findings on the relation of mental disorders to population density, several factors related to density will be mentioned in the course of the explanation so that findings more closely associated with these related factors will not be falsely attributed to density. These factors are socioeconomic level, national origin, gravitation and ascent, selective migration and heredity.

Socioeconomic level has previously been shown to have considerable influence on the rate of psychiatric disorders. In the previous study all communities were rated according to medical, educational and recreational facilities, "class," public works, housing and welfare rates, and grouped into six categories of desirability, with A the rating for the best communities and F that for the poorest.

The *national origin* of people in a community, as shown by the proportion of people from certain nationalities, seems sufficient to account for variations in rates of mental disorders. There is considerable difference in distribution, with the Irish, Italians and Russian Jews the major elements in some of the large cities and French Canadians and Portuguese in others, with higher proportions of Old Americans in many of the suburban and semirural areas.

There is *gravitation* of the inadequate to the poorer communities and *ascent* of the ablest into the better communities.

Selective migration is that of the adventurous rural youth to urban areas.

Heredity is a difficult factor to measure, but is closely allied with density because of the fact that marital choice is more limited in areas of lower density and increases the chances of inbreeding.

This paper deals primarily with the effect on mental disorder of the cultural factors related to population density. The aim is not to depreciate biologic factors, but to simplify the explanation of the findings and to discover how extensively cultural explanations are applicable. To do this the following hypothesis has been adopted: mental disorders in any community are to a great extent determined, both in type and in prevalence, by the culture of the community. The amount and types of mental stress and the acceptability of both normal and abnormal outlets from stress are parts of the culture and determine the type of disorder manifested.

The hypothesis presented by Faris and Dunham[10] that communication is essential for normal mental development and that social isolation makes for mental breakdown appears to be especially pertinent to these findings.

Results

In Table 1 the rates for all major causes of psychiatric rejection are related to different population densities. The rates for all communities with a population density of over 500 per square mile show a steplike increase in mental disorders from 7.5 up to 14.0 per cent with increased population density. The communities of less than 500 people per square mile stand out markedly from this pattern with the high rate of 12.1 per cent. This table indicates that to a considerable extent the relation to density of the total rate of psychiatric rejection can be explained on the basis of variation in socioeconomic levels. Only in the consideration of those communities that present rates for mental disorder varying from that to be expected on the basis of socioeconomic level, and in that of specific mental disorders, is the importance of population density alone demonstrated. Each of the communities of density of less than 500 per square mile was investigated, and some presented an unexpected deviation from the average rate for that density level. The three communities that had especially high rates included isolated areas and appeared to represent the features of degenerate rural communities in which the ill effects of isolation and of inbreeding may exist.

A study was made of the communities that had the highest rates of mental disorders and those that

Table 1. *Relation of Percentage Rejected for All Major Psychiatric Causes to Community Density of Population.*

Density per Square Mile	No. Examined	Rejection Rate %	Socioeconomic Level
Less than 500	2,856	12.1	D+
500-999	4,478	7.5	B−
1000-1999	6,340	8.5	C+
2000-4999	8,056	9.2	C
5000-9999	13,322	9.5	C
10,000-19,999	14,108	10.6	D
20,000 or over	10,840	14.0	E

had the lowest. Of the 13 communities with extremely high rates, 8 were in the extreme density bracket (over 20,000 people per square mile). By contrast, of the 13 communities with extremely low rates, not one was in either extreme density bracket (under 500 or over 20,000 population density). Ten of the 13 were in areas characterized by one-family and two-family houses and 9 were in suburbs of Boston.

In order to define the interrelation of socioeconomic status and population density, the socioeconomic level was determined of those communities in each density level that varied in rate of mental disorders from the average rate of the group as a whole. Twelve of the 14 communities with low rates for mental disorders were of a higher socioeconomic level than that of the density group to which they belonged, confirming the influence of economic level within the same population density. A similar study was made of differences in population density of communities in each socioeconomic level whose rates varied from the group average. Those communities with populations of less than 500 and over 20,000 per square mile tended to have higher rates than the group average.

Although the total psychiatric rejection rate does not reveal the extent to which differences in rate can be directly attributed to density of population, it is apparent when the separate causes of rejection are examined that change in type of disorder rather than in amount of disorder is notable in different density levels.

Mental Deficiency

The relation of mental deficiency to population density is represented in Table 2. An outstanding finding is that throughout the entire intermediate range of density from 500 up to 20,000 per square mile there was no significant difference in the rate of mental deficiency. The highest rate was found in the communities of population density less than 500 per square mile, and the next highest in those of population density at the other extreme, over 20,000 per square mile. The highest rate of mental deficiency in the rural areas confirms the findings of the studies of the draftees of World War I[8] and that of Dayton.[5]

TABLE 2. *Relation of Percentage Rejected for Mental Deficiency to Community Density of Population.*

DENSITY PER SQUARE MILE	REJECTION RATE %
Less than 500	2.7
500–999	1.3
1000–1999	1.5
2000–4999	1.6
5000–9999	1.3
10,000–19,999	1.2
20,000 or over	2.2

It is interesting to compare those communities having the highest rates of mental deficiency with those having the lowest. All but 3 of the 11 communities with high rates of mental deficiency have predominant foreign elements, usually Italian and Portuguese. The relation of mental deficiency to nationality is significant and will be considered in a following paper.[11] The 3 other communities with high rates were rural communities having a predominantly Old American population. Each of these communities is known to contain areas of degeneracy and inbreeding. In one there is a neighborhood of albinos. Another includes islands wherein there are large numbers of deaf-mutes whose defects resulted from inbreeding, a fact described by Rosenau.[12] A third has many isolated areas. All these communities have a minority Portuguese population who live in their own settlements among the Old Americans. The high rate among the Portuguese for failure to meet the usual standards is one reason for the high rates found in these communities.

The degree of isolation of the 3 rural communities was further studied by examination of town reports to see to what extent townspeople married outside their community. It was found that they married within their neighborhood to a far greater extent than in other areas.

None of those communities with extremely low rates for mental deficiency were semirural (under 500 people per square mile), and none were dense urban communities (over 20,000 per square mile). The only communities with density over 10,000 per square mile were composed largely of Irish and Jews, who have a low rate for mental deficiency. The communities are all in Boston or suburban or adjacent to it.

Determination of the differences in mental deficiency in communities of different density but of the same socioeconomic level revealed a trend toward decreased rates of mental deficiency with increase of population density.

For an explanation one can first consider that suggested by Dayton[5]; namely, mental defectives tend to drift to the areas of lesser competition that are the least dense areas. To this could be added that the mental defectives originating in the rural areas are likelier to remain there and not to escape to the city, and that inbreeding occurs sufficiently often in certain isolated neighborhoods of these rural communities so that mental deficiency may be increased genetically. It is also likely that the decrease in mental stimuli in the simple rural cultures tends to increase the rates for failure to meet mental tests. Selectees having a rural background are apparently less frequently confronted with situations requiring the concentration and speed needed in an adequate test performance. As a result, they adapt themselves to the test situation less readily than do the urban selectees.

Gillette[1] states that illiteracy is four times as high in rural areas as in urban areas. It is known not

only that urban educational facilities are better, but also that the urban child's school attendance receives more social encouragement and statutory enforcement than does the rural child's. Although our tests are supposed to minimize the influence of education and literacy, it cannot be expected that this aim has been achieved in every case. People who have attended school are able to adjust themselves more quickly than others to the test situation.

Although the relation of mental deficiency to population density is concealed in part by its relation to both socioeconomic level and nationality, it may be concluded that in isolated rural communities there is an increase in the rate of mental deficiency, and that in urban communities, except in the slum areas of foreign population, there is generally a decrease.

Psychopathic Personality

The relation of psychopathic disorders to population density is represented in Table 3. The rate for psychopathic personality is high in rural communities, but the highest rate is in the densest communities. The relation of psychopathic personality to population density is less consistent than it is to socioeconomic level. The findings are notable, however, since previous studies of rates of delinquency, the disorder that compares most closely with our classification of psychopathic personality, have not shown a high rural rate. In view of the fact that the country youth with criminal inclinations tends to migrate to the city to find richer fields for his crimes and a more adventurous existence, it is interesting that there is still a high rate of psychopathic personality in the rural areas.

TABLE 3. *Relation of Percentage Rejected for Psychopathic Personality to Community Density of Population.*

DENSITY PER SQUARE MILE	REJECTION RATE
	%
Less than 500	3.5
500–999	2.2
1000–1999	3.2
2000–4999	2.8
5000–9999	3.4
10,000–19,999	3.5
20,000 or over	5.7

Two of the low-density communities that had high rates for psychopathic personality also had unusually high rates for mental deficiency and were known to include degenerate areas. One other community with a high rate for psychopathy was of higher population density (1000–1999), but also included at least one community of degenerate Old Americans.

Conflicting factors enter into the rural rates for psychiatric disorders, for in the rural areas both work and play tend to be on a physical level, a circumstance that tends to increase physical outlets for asocial tendencies. On the other hand, asocial conduct tends to be minimized by the strong social pressure of the family and neighborhood group that is so strong in the rural areas.

Since America has become urbanized with the coming of the industrial era, some rural disorganization has occurred, especially in the last three decades. The wage scale of rural life, even though it allows for security, does not always furnish the physical possessions — for instance, automobiles and movies, which have come to be part of American life. The home and group recreations of the rural community have given way to the commercialized recreations available in the neighboring cities. No longer is the rural youth content with simple rural pleasures. Since his desire for things is stimulated beyond his ability to satisfy it, he comes under the same social stress as does the boy in the slums. The ensuing disorganization is a result of a combination of economic and rural factors.

The extreme density of the urban slums is no doubt associated with their economic level in producing the high rate of psychopathic disorders. The sequence of circumstances may be that poverty tends to keep people in overcrowded slums, and that the overcrowding in turn throws them into too close contact with an abnormally large and diverse group of people. This increases the likelihood of gang development, of personal conflict and of association with older and more criminal associates.

Of those communities with the low rates for psychopathic personality none are of density over 10,000 per square mile and none are in Boston. It may be found with further study that the psychopathic personality of the city is not the same as that of the rural community. Possibly the urban type of psychopath is essentially an aggressive, acquisitive, asocial personality, whereas the rural psychopath is an irresponsible, futile and generally inadequate one.

Chronic Alcoholism

Table 4, showing the relation of chronic alcoholism to population density, reveals a totally different pattern than that of the previously considered mental disorders, for in the case of chronic alcoholism the rate in the rural communities (density less than 500) is not increased. There is a low rate in the 2 community groups of lowest density, and an increase with increasing population density. There appears to be a better correlation of chronic alcoholism with density than with socioeconomic level, for in the study of the latter it was shown that there was no appreciable difference in rates for chronic alcoholism between the communities in the upper segments of desirability (A, B and C communities).[4]

The strong relation of alcoholism to population density is further substantiated by an increase in alcoholism with the increasing density when a correction is made for economic level, and by the fact

that there are no low-density communities (density less than 2000 per square mile) that have a high rate of alcoholism, even though several have a low socioeconomic level.

The stimuli that help to promote drinking tend to increase in direct proportion to the density of the population. The farmer is not constantly confronted by whisky and wine advertisements and by bars and cafés. Not only stimuli but also opportunities are more frequently increased with density. Granted that the confirmed alcoholic addict will go far for a drink, somewhere in his development the matter of opportunity for frequent drinking must be important. The man who must pass a bar on every corner as he returns from work would be expected to drink oftener and more than if he had to go several miles to the nearest village to get a drink. Furthermore, the long working hours of the farmer and the time spent at sea by the fisherman decrease the frequency of their drinking.

TABLE 4. *Relation of Percentage Rejected for Chronic Alcoholism to Community Density of Population.*

DENSITY PER SQUARE MILE	REJECTION RATE
	%
Less than 500	0.6
500–999	0.6
1000–1999	0.8
2000–4999	1.1
5000–9999	1.2
10,000–19,999	1.4
20,000 or over	2.1

The closer family life of the rural and semirural communities is conducive to more drinking at home and less in taverns and bars. To what extent this factor affects the incidence of alcoholism is not known, but it is quite possible that the man who drinks at home is favorably influenced by his wife and family to drink moderately, in contrast to the man in the tavern or at the bar, who is so often encouraged by his friends to drink to excess.

A further factor is that of the relation of drinking to sociability. In the rural areas, because of the lack of and need for gregarious living, there is a higher degree of sociability within the neighborhood whenever it is possible for people to get together. Because of the great congestion of the city, barriers are drawn up that isolate the individual from the crowd. In the urban settings the restraints of privacy that have become customs retard sociability, and alcohol serves to dissolve a man's restraint and to aid that freedom of social intercourse that occurs in the rural setting without its aid.

To emphasize density is not to minimize the other factors affecting alcoholism. There is an acknowledged gravitation of the alcoholic addict into a poorer community; there are nationalities with religious or ethical taboos against alcoholism, and there are others with excessive rates for alcoholism, a factor that will be shown in a following paper.[11] The question of acceptability of drinking is much disputed, and varies as much with local culture as does any other habit or custom, but in this consideration we point out only the importance of the relation to population density.

PSYCHONEUROSIS

Table 5, showing the relation of psychoneurosis to population density, reveals no consistent pattern. It is notable that the highest rate (4.9 per cent) occurs in the rural communities, with another peak of 4.2 per cent in the communities of 10,000–19,999 population per square mile.

In the relation of psychoneurosis to socioeconomic level, there are a decrease at the extremes and slightly higher rates throughout the communities of intermediate desirability. The finding of high rates in the rural communities is not in agreement with Dayton's[5] finding of a higher rate of psychoneurosis in hospital admissions from urban communities. This appears to demonstrate the difference in findings between a cross-section study such as this one and a study involving the selective factors of hospitalization.

TABLE 5. *Relation of Percentage Rejected for Psychoneurosis to Community Density of Population.*

DENSITY PER SQUARE MILE	REJECTION RATE
	%
Less than 500	4.9
500–999	3.2
1000–1999	2.8
2000–4999	3.5
5000–9999	3.2
10,000–19,999	4.2
20,000 or over	3.7

The finding of Sherman and Henry[13] in *Hollow Folk* that the frequency of neuroses increased as the inhabitants moved from Colvin Hollow (an isolated backward community) to the outside world is not substantiated. It may be that the rural communities studied here present features of cultural disorganization and industrialization that are not present in the relatively backward and isolated Colvin Hollow.

A further factor that is probably important is the association of psychoneuroses with fear, ignorance and superstition that often occur in the isolated community. Medical attention, even when available, is in many neighborhoods infrequently sought, and when a man is in pain, he often listens to relatives and friends tell him what his trouble is or how they have seen someone die with just such a pain. Instead of going to a physician to obtain the reassurance of a diagnosis, he permits his fears to become so multiplied and aggravated that the apprehension and anxiety continue long after the pain is gone. Although competitive stress is not great in isolated rural areas, boredom often makes illness the most dramatic and interesting thing in

life. Births, deaths, accidents and operations are events of great social importance to the community, and as a result, neurotic manifestations are encouraged, especially among those who have few other ways of gaining attention.

Communities of a Predominant Nationality but of Markedly Different Densities

Fortunately, the 4 communities that had the highest proportion of people of Italian origin represented an extremely wide range of density. They included at one extreme a mill town with outlying rural areas, and at the other, one of the world's most crowded slums. Their rates for major psychiatric disorders followed roughly the pattern of all communities arranged according to density (Table 6).

Table 6. *Rejection Rates for Psychiatric Disorders in Four Italian Communities of Markedly Different Population Densities.*

Community	Population Density	Mental Deficiency Rate	Psychopathic Personality Rate	Chronic Alcoholism Rate	Psychoneurosis Rate	Psychoses Rate	Total Rate
		%	%	%	%	%	%
C 51	60,000	5.2	6.9	1.2	4.5	.39	18.1
C 21	20,000	3.8	4.4	1.4	2.9	.60	13.1
C 89	7,000	1.0	1.8	0.8	3.9	.00	7.4
C 201	1,500	2.1	2.4	0.3	5.7	.30	10.8

With the variable factor of nationality thus controlled, the great similarity between the variations in this table and those in Tables 1 to 5 indicates how significant density is in determining both the extent and character of mental disorders, and how imperative it is, in studies of nationality, to make correction for both socioeconomic level and population density.

Size of Communities

In order to present a study of the relation of mental disorders to population density that would conform to other studies based on the size of the community rather than on its density, communities were arranged on the basis of their sizes (Table 7). This not only furnished a comparable study but also served as a summary of the findings.

Semirural communities. The rates for mental deficiency and psychoneurosis are higher in these areas than in urban communities of all sizes. The rate for psychopathic personality in semirural communities is higher than that in either the small or moderate-sized cities, and is exceeded only by the rate for a large city (Boston). Their rate for chronic alcoholism is lower than in the urban communities of all sizes.

Towns and small and moderate-sized cities. Cities of a great variety of size present similar patterns of rates for mental disorders. Even the pattern for large towns is similar to that in urban areas, just as the characteristics of towns, presenting as they do urban features on a small scale, bear more resemblance to those of the cities than to those of rural areas.

The rates for mental deficiency and psychopathic personality are comparatively low in the urban communities, increasing gradually with the size of the community, and are highest in the semirural and very dense communities. The rate for alcoholism increases in proportion to the size of the city, being lowest in semirural communities and highest in a large city (Boston). The rates for psychoneurosis, although lower than that in semirural communities, do not vary significantly in cities of different size.

Large city. In a large city (Boston), there is an extreme density not to be found in the merely urban environment. The rate for mental deficiency is increased consistently with its increase throughout the small cities. The rates for psychopathic personality and chronic alcoholism increase so sharply that the single factor of density seems inadequate to account for the increase. The rate for psychoneurosis is unchanged.

Table 7. *Rejection Rates for Psychiatric Disorders in Communities of Different Size.*

Size	Socioeconomic Level	Mental Deficiency Rate	Psychopathic Personality Rate	Chronic Alcoholism Rate	Psychoneurosis Rate	Psychoses Rate	Total Rate
		%	%	%	%	%	%
Semirural communities	D+	2.4	3.7	.6	4.4	.45	11.6
Towns	B	1.3	2.4	.9	3.3	.09	8.0
Small cities	C	1.5	3.0	.9	3.7	.33	9.4
Moderate-sized cities	C−	1.6	3.2	1.2	3.4	.35	9.8
Large city	D−	1.8	4.8	1.8	3.7	.31	12.4

Comment

In communities of varying size different patterns of mental diseases are present that are most significant at the two extremes, the largest city and the semirural areas.

Rural communities are for the most part characterized by isolation, monotony of existence and lack of those commercialized recreations — theaters, soda fountains, bars and night clubs — that have come to be so demanded by urban society — and by lack of those business opportunities that modern ambition requires. Wages are adequate to buy those things considered necessary in rural culture — simple food, simple clothing and shelter — but not those things considered necessary in modern culture. Radios, automobiles, washing machines, flush toilets, vacuum cleaners and electric lights are difficult to obtain with rural wages. On the other hand, in the large cities, represented here by Boston, where the recreational facilities, business opportunities and modern conveniences that the rural areas lack are found, there are also the undesirable features of congestion and overcrowding, with the resultant lack of privacy, fresh air, open fields and woods. Commercialized recreation takes such a dominant place in urban life that home life is often weakened. The intensity of economic and social competition that overstimulates the individual may blunt his ethical sensitivity and make economic success his only important goal. The hopelessness of failure or the fear of it in such competition is as abject as the morbid discontent, apathy or boredom engendered in the rural areas.

Faris and Dunham[10] find the factor of social isolation to be important in mental disorders in the densest urban rooming-house areas. Perhaps the anonymity afforded in the rooming-house area of the great city offers as great a degree of social isolation as do the rural areas, and perhaps the increased isolation in both these extremes of population density is responsible for the increase of rates of mental disorders at the extremes.

Only between these two extremes is there present the mean that satisfies most fully the aspirations of modern life. In the small city, and to a lesser extent in the moderate-sized city, there are those advantages of interest, stimulation, excitement of easily accessible recreational facilities, business opportunities and modern conveniences that are lacking in the rural communities, without the loss of the rural advantages of open fields, woods and strong family life. Security still exists to a great extent. The competition is not so intense as in the great city, aspirations are not so high, and the opportunities that are present are not overwhelming or confusing. The personality is not crushed by intense overcrowding and competition, nor is it stimulated to intensely aggressive action, as in the great city, nor stifled by isolation and boredom, as in the rural areas.

It is not surprising to find both the rural areas and the great city having similar rates for mental disorders, for both types of communities have many unfavorable features. The most adequate people, as judged by their adaptation to modern life, migrate to the urban communities from both the rural and dense urban areas, leaving the less able people behind. Thus, the increased numbers of inadequate people left at the undesirable extremes of density, as well as unfavorable factors of these types of communities, account for the high psychiatric rates at the two extremes.

Summary

The rejection rates for the major mental disorders found in selectees examined at the Boston Armed Forces Induction Station are compared with the population densities of the communities from which the selectees came, with the following findings.

Mental disorders differ in type in areas of different population density, irrespective of factors of socioeconomic level and national origin.

The highest rate of disorders are at the two extremes, with the highest rate of mental deficiency and psychoneurosis in the semirural areas and the lowest in the small cities.

The highest rate of chronic alcoholism and of psychopathic personality is in a large city (Boston); the lowest rate for chronic alcoholism in the semirural communities, and the lowest for psychopathic personalities in the small cities.

Only chronic alcoholism is correlated with population density throughout its complete range. It appears more closely associated with density than with socioeconomic level.

This study points to the need of intensive study in communities of different population density regarding the influence of the community environment on mental health.

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TROPICAL ULCER

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SAN FRANCISCO

SINCE going into operation in a South Pacific area, the dermatological service has been confronted with a type of skin ulcer that is entirely new to most of the medical officers. With little definite knowledge, and a paucity of written material on this type of skin lesion, the complete armamentarium of medical resourcefulness in this area, or as near complete as possible, has been devoted to the treatment of these patients, the main standby being the sulfonamide drugs. The ulcers eventually heal, but only after long periods of time, many lost or inefficient fighting days and a heavy attendance at sick call.

It must be remembered that for the work here reported laboratory facilities were meager, bacteriologic studies practically nil and pathological examination a scarcely hoped-for dream. Nevertheless, many tropical ulcers have been treated, all available and recommended therapeutic agents, and several that were not recommended have been tried, and definite conclusions have been reached. These are presented, together with a suggested course of treatment, for the benefit of all concerned. It is believed that such a presentation will be a definite advantage to others who have been thrown into a new environment with its own peculiarities.

The only source of detailed information on this subject to be found in the literature is *Stitt's*[1] *Diagnosis, Prevention and Treatment of Tropical Diseases*. I am greatly indebted to this fine book, from which I shall frequently quote.

This disease is variously known as ulcus tropicus, tropical sloughing phagedena and Naga sore. It consists of an acute or chronic skin lesion, of uncertain etiology but closely related to the presence of spirochetes and fusiform bacilli, and characterized by an irregular or rounded appearance, — usually the latter, — indurated edges, an excavated base, a dirty-greenish-gray sloughing membrane and red granulation tissue in the base and walls. The lesion seems to be different from that recently described by Dostrovsky and Sagher[2] as phagedenic ulcer, which has an undermined edge and no evidence of spirochetes or fusiform bacilli, and is best treated by the local application of sulfapyridine.

According to Stitt[1] this disease is most frequent in Amazonia, and is prevalent in India, Indo-China, southern China and the Philippines. It is said to be the chief cause of disability among laborers in Malaya, and was studied extensively by James[3] in the Solomon Islands. The number of cases that find their way into the hospital is in all probability not greater than 50 per cent of the total.

ETIOLOGY

The exact etiologic agent is as yet uncertain, but James[3] found spirochetes in 65 to 75 per cent of the ulcers and fusiform bacilli in all. Our findings closely follow these figures. Of an appreciable number of early cases, 70 to 75 per cent showed positive smears for spirochetes. Of the later cases, only 50 per cent were positive for these organisms. Practically all the ulcers contained fusiform bacilli. Another frequent finding, which occurred in 60 per cent of the cases, was the presence of diplococci and diplobacilli that stained blue with Giemsa's stain or Loeffler's methylene blue. Gram's stain was not available, so that it could not be determined whether these organisms were gram-positive or gram-negative. In many cases, diplococci and diplobacilli were the only organisms reported.

The spirochete is a slender, delicate spirillum with a variable number of shallow undulations. It resembles and is possibly identical with *Spirochaeta vincenti*. The fusiform bacilli are plump and 5 to 7 microns in length, with straight or slightly tapered ends; they also stain blue with Giemsa's stain or methylene blue and resemble or are the same as those found in Vincent's angina. Many investigators believe that the spirochetes and bacilli are different

FIGURE 1. *Lesion of Three Weeks' Duration (1.2 cm. in diameter). Note the indurated, raised edges.*

stages of the same organism. Tunnicliff[4] states that in cultures of fusiform bacilli spirochetes appeared after five days. Smith[5] states that he, too, has seen spiral forms take the place of fusiform bacilli in pure culture. The present findings show no evidence that a fungus is the etiologic agent.

The history of onset is practically always an infection superimposed on injured or broken skin — often the result of a slight bruise, abrasion or insect bite. The ulceration appears to be unable to gain a foothold on healthy tissue. These infections are most frequent when the troops are in combat or go out on patrol duty. Although at such times the men are usually fully clothed, they suffer scratches through their clothing. Lowered body resistance and a diet inadequate in vitamins have been suggested as factors in the etiology, but it has not been possible to confirm this theory.

Pathology

It was impossible to prepare sections for pathological examination. According to Stitt,[1] the histologic characteristics are as follows: the tissue undergoes coagulation necrosis; there is an upper layer of coarsely meshed fibrin containing degenerating polymorphonuclear leukocytes, spirochetes and fusiform bacilli; the epithelium surrounding the ulcer is thickened; its walls and base consist of granulation tissue with a surrounding area of lymphoid and plasma cells and fibrous tissue; lastly, spirochetes are found in the surrounding tissue over an area of 1 or 2 cm. — which may account for the poor results obtained by the use of local applications.

Symptoms

The lesion described above soon develops a dirty-greenish-gray pseudomembrane, which is usually adherent and, on removal, reveals a relatively deep, excavated ulcer. This ulcer may become larger or remain the same size, with the formation and reformation of the membrane. The lesions are usually on the extremities, most frequently on the lower legs. They may be single or multiple, with as many as ten to fifteen on one leg. They vary from 1 to 7 cm. in diameter. The severity ranges from mild to marked, the majority of our cases being moderate. The duration in the acute cases is two or three weeks, and in chronic cases, two to three months — in some cases as long as six to eight months. Approximately 8 per cent of the cases show moderate to marked secondary infection. The ulcers are somewhat sore but not painful. Fever is absent or slight, and no constitutional reactions occur. There is no increase in the white-cell count, and the red-cell count is normal. Kahn tests of the blood serum give a negative reaction.

Prognosis

These ulcers have not been watched long enough for one to observe whether they are self-limited. They probably are not, for the duration in many cases has been months, and even these cases had some treatment. The lesions heal with brown to red scar tissue. Over periods of six to eight months, similar lesions have not faded appreciably and leave disfigurement, since the ulcer invariably extends into the subcutaneous tissue. Although its old site appears as a weak resisting point for reinfection or ultimate breakdown, this does not seem to be the case, and there have been only 2 cases in which a second lesion was superimposed on an old site.

Treatment

The treatment of these ulcers presented a problem. From the start it was apparent that they would not respond adequately to ordinary aseptic care. To evaluate all the forms of treatment recommended by Stitt[1] and to ascertain which was the most suitable, various medicants and procedures were used in the first half of the cases of this series. The later cases were treated by the method of choice. The more favored methods were used in a large number of test cases, and the less favored in a smaller series. At least a two-week trial was given any treatment before it was given up as having little value. The methods of treatment used were as follows.

Figure 2. *Confluence of Two Lesions. The ulceration measured 3 by 2 cm. Note the irregular margin and the brawny induration about it.*

Potassium permanganate diluted to 1:5000 and given in the form of hot packs, caused little improvement, nor did a 6 per cent solution painted on the lesions give better results.

Sodium iodide orally and *hydrogen peroxide* locally, as has been recently recommended, were tried, with no favorable results. The procedure was to give 1 gm. of sodium iodide orally three times a day. One to two hours later, when the concentration of the iodide in the blood stream was supposedly greatest, a pack of a 1 to 3 per cent solution of hydrogen peroxide, which had been made acid with acetic acid, was placed on the ulcer. Theoretically, the iodide combines with the hydrogen peroxide, setting free nascent iodine in the tissue, which acts as a bactericide.

Copper sulfate in a 10 per cent aqueous solution or a 30 per cent glycerin solution, applied locally, was ineffective.

Formaldehyde in a 7 per cent solution, applied locally, appeared to clean up the ulcer, but the latter showed no evidence of closing over.

Cleansing with *alcohol* and covering the area with an occlusive vaseline dressing, which was left in place for a period of three days, was unsatisfactory.

Human plasma in the dried form or as a four-times concentrated solution, applied locally, seemed to have some value but was eventually given up as inadequate. The dried plasma gave better results than did the solution.

Bismuth subsalicylate in daily local applications gave no favorable results. Intramuscular injections of 0.5 cc. at the start, followed by 1.0 cc. every other day for three doses and then twice a week to a limit of ten injections, showed good results if sulfanilamide powder was used locally at the same time and an occlusive vaseline dressing was applied when the ulcer appeared to be clean. The vaseline dressing was left in place for three days. Although this method often gave excellent results, it did not seem to meet the situation. The ulcers progressed to a nearly healed stage, but from then on many took a long time to heal.

Sulfanilamide or *sulfadiazine* powder used locally seemed to clean the ulcer, but there was no evidence of healing.

Neoarsphenamine, either in a 3 per cent glycerin solution or in powder form, applied locally, had little apparent effect in healing the ulcer.

Ferrous sulfate and *vitamins*. On the basis of a vitamin deficiency and lowered body resistance, the first half of the patients were given 2 gm. of ferrous sulfate daily and tablets providing 15,000 units of vitamin A, 1200 units of vitamin D, 225 mg. of vitamin C (ascorbic acid), 6 mg. of thiamine chloride, 9 mg. of riboflavine and 60 mg. of nicotinamide, to which was added 150 mg. of niacin (nicotinic acid), daily. There was no apparent improvement compared with the later cases, in which ferrous sulfate and vitamins were given only when indicated.

FIGURE 3. *Lesion of Six Weeks' Duration (3 by 2 cm.). Note the thickened edges, the granulating base and the excavation.*

Periods of exposure to *sunshine* (ultraviolet rays) seemed to have no special value.

Mild *mercurous chloride ointment* was used locally. This seemed to clean the ulcer, but there was no evidence of healing.

Acriflavine in 1:1000 solution, which has been used by other investigators, and *vaccine therapy*, which has been recommended in spite of relatively unsatisfactory results, were not available. *Penicillin* was not available in quantities to warrant its use.

Mapharsen was substituted for the recommended intravenous neoarsphenamine or novoarsenobenzol. In a 0.3 per cent solution or in powdered form applied locally, it caused moderate improvement but did not close the ulcer. The best results were obtained from intravenous injections. The often seen brawny induration and soreness about the site of the ulcer disappeared after one or two injections, but the greenish-gray membrane continued to form. For this reason sulfanilamide or sulfadiazine powder was also used locally. This form of treatment gave by far the best results. In five to seven days the ulcer became clean, and the induration and soreness rapidly disappeared. In about ten days the ulcer began to appear smaller, with new epithelium growing in from the edges. At the present time, the average ulcer heals and the patient is discharged from the hospital in two or three weeks. Needless to say, aseptic dressings and technic are used. Large ulcers take longer to heal, and early or small ones respond faster than do chronic ones. The dosage used was 0.03 gm. for the first dose and 0.06 gm. for the subsequent doses. The first three doses were given three days apart and the remaining doses five days apart, for as long as indicated. Reactions to the Mapharsen occurred in only 3 cases, and were mild.

Curettage and skin grafting was not necessary in most cases. Two recent cases were curetted, solely for the purpose of removing thick, firm and heavy necrotic tissue. One of these ulcers is filling in rapidly from the bottom, and both are showing healthy granulated tissue. It is possible that these cases will do better with later skin grafting, although in a recent elderly patient a similar ulcer on the lateral aspect of the knee, 6 cm. in diameter but not deep, healed completely and firmly in six weeks, with a scar only 2.5 cm. in diameter.

Ambulatory Treatment

Recently, members of a line battalion have been treated as ambulatory patients with the method of choice, namely, intravenous Mapharsen, local sulfanilamide powder and occlusive dressings. The first patient had numerous lesions on both lower legs of superficial or moderate degree. The duration of the disease was two months, with numerous visits on sick call and little or no evidence of healing. Under treatment, with daily dressings for one week and

then every fifth day, the lesions healed in three weeks. The second case was an indurated lesion on the lower leg of three weeks' duration. This healed completely in three weeks. The third patient had several superficial ulcers on both arms of four weeks' duration. These dried and healed following one injection of Mapharsen.

FIGURE 4. *Lesion of Four Weeks' Duration (3.8 by 5.0 cm.). This eventually healed, with a flat scar one third size of that shown.*

CONCLUSIONS

Spirochetes and fusiform bacilli appear to be a definite factor in the production of tropical ulcers.

These ulcers usually occur on broken or injured skin. Therefore, all troops should be cautioned about this, so that they may promptly apply a bactericide and first-aid dressing, in an effort to prevent ulcer formation at these points.

Medical officers should learn to recognize these ulcers early. They should not experiment with the easily available sulfonamide drugs or ointments, gentian violet, or Frazier's solution to see what will happen, but should proceed directly to treat vigorously with intravenous Mapharsen, and apply sulfanilamide or sulfadiazine powder to the ulcers, as their appearance or bacteriology may direct. After the ulcer has become clean, an occlusive vaseline dressing should be applied and changed infrequently.

Mapharsen can and should be made easily available to forward echelons, and treatment should be instituted in the early stages of the ulcer. In this way patients can remain ambulatory, with no loss of man-days of work or fighting and no hospitalization.

I am indebted to T/3 Basil L. Miner and T/5 Edward Puskarz, ward supervisor and wardmaster, respectively, for their interest and co-operation in the treatment and care of these patients and to T/5 Jack C. Renner for his work in smear and slide diagnosis.

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THE USE OF BLOOD IN THE TREATMENT OF DUODENAL FISTULA

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BOSTON

EXTERNAL duodenal fistula constitutes a problem of great importance: and if not corrected usually terminates fatally.[1] Fortunately, it is a rare complication. Up to 1923 only 61 cases had been reported.[2] In a more recent communication by Bartlett and Lowell,[3] however, 128 authentic cases were presented in what was believed to be a complete review of the literature from 1865 to 1937. It is apparent that within the last two decades the prevalence of this disease has increased, perhaps owing to the greater number of operative procedures carried out in the right upper quadrant of the abdomen.

The mortality is still extremely high. Most authors consistently report an approximate mortality of 50 per cent irrespective of the procedures used, whether medical or surgical.[4] Management along conservative measures, however, has considerably reduced the mortality.[5] According to Kittelson,[6] 65 cases treated conservatively had a mortality of 23 per cent. Unquestionably the latter treatment has become the procedure of choice within the last ten years, and surgery has been reserved for cases in which there is a definite indication for it.

External duodenal fistula is usually caused by injury to the duodenum during the performance of a surgical operation in the right upper quadrant of the abdomen, such as that on the duodenum itself, the pyloric end of the stomach, the gall bladder, the liver, the hepatic flexure of the colon and the right kidney.[7] It is not intended to review the etiology in greater detail or to describe the pathologic physiology, the symptoms and the matter of diagnosis of duodenal fistula, inasmuch as these have been adequately dealt with in a recent contribution.[3]

In this paper is presented a case of external duodenal fistula following an operation for gall-bladder disease in which all known therapeutic methods were tried, with extremely poor results. The effects of dehydration, acidosis and the inevitable extensive and severe excoriation of the skin were so pronounced that a supposedly new method of remedying this trying situation was tried — the use of whole blood in the wound, packing the latter firmly with cotton. Following this procedure the duodenal fistula promptly ceased draining. There was immediate relief in the systemic symptoms, as well as beneficial effect on the surrounding skin, with prompt healing of the fistula.

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CASE REPORT

A. S. (C 55429), a 57-year-old, married woman, was admitted to St. Elizabeth's Hospital on August 8, 1943, with a history of upper abdominal pain and vomiting of 48 hours' duration. The pain was constant, with intermittent exacerbations that had become increasingly severe. For the last few years, the patient had been in good health with the exception of vague digestive disorders, characterized by belching of gas, a bloated feeling and moderate hyperacidity. No similar acute episode had been experienced prior to this one.

On physical examination the patient was obese, weighing 179 pounds, and appeared quite ill, dehydrated and in acute pain, with marked nausea and occasional vomiting. The abdomen was distended and slightly tympanitic. On auscultation no borborygmi were noted. There was marked tenderness, with rebound pains throughout the upper abdomen, and moderate rigidity. No palpable masses were noted. The liver was not palpable. The temperature was 99.8°F., the respirations 25 and the blood pressure 128/30. The red-cell count was 4,610,000 and the white-cell count 10,000, with 76 per cent polymorphonuclear leukocytes. The hemoglobin was 90. The urine was essentially normal save for a slight possible trace of albumin.

Intravenous replacement of fluids was started, and an initial plain film of the abdomen was taken. This showed considerable gas, especially in the upper right quadrant, with mottling over the gall-bladder region that resembled calculi. The patient's general condition did not improve, and the next day a laparotomy was performed through an incision in the upper part of the right rectus muscle. Exploration revealed a small quantity of free bile in the peritoneal cavity. The greater omentum was curled around and adherent to the first and second portions of the duodenum. It was freed by sharp dissection, revealing the first and second portions of the duodenum, which were firmly adherent to the inferior surface of the liver. To expose the gall bladder and its ducts, the adherent duodenum was in turn freed from the liver.

Despite the utmost care in exposing the deeper tissues, which were quite friable, a rent of 2 cm. occurred in the duodenum. This was quickly closed. Two rows of intestinal sutures and a third of linen were used, and the opening was securely covered with omentum. The gall bladder was contracted, cordlike and almost fused into the liver bed; eight stones were extracted. The common duct was of normal size and no stones were palpable. The cystic duct was doubly ligated and divided with a cautery. The contracted, sclerotic gall bladder was so firmly incorporated in the liver tissue that removal was not attempted because of the extent of liver damage inherent in such procedures. Five grams of sulfanilamide was sprinkled in the abdomen. A Penrose drain was inserted in Morrison's pouch and brought out through the lower end of the incision, and the abdomen was closed. The immediate postoperative convalescence was complicated by a bronchopneumonia that cleared up 7 days later with the aid of sulfonamide therapy.

On the 3rd postoperative day, the Penrose drain was withdrawn and only a small amount of bile drainage was noted. On the following day, a greater amount of bile-stained drainage was present and soon increased. The character of the drainage had changed and a marked excoriation of a large abdominal area about the incision had occurred, establishing the diagnosis of duodenal fistula. On the 5th postoperative day, the drainage was profuse and the upper part of the wound had sufficiently separated to permit a clear view of two fistulous openings, the larger one measuring 6 by 2 mm. and the smaller 3 by 2 mm. The skin was protected by equal parts of kaolin and zinc-oxide ointment. Dressings had to be changed every 1 or 2 hours, despite continuous suction

and an indwelling nasal tube. Donald's[4] method* was then tried for 3 days, but there was no appreciable relief and the drainage did not diminish. The patient became increasingly weak and was maintained on intravenous therapy. During drainage, particles of undigested food were present and even fruit juices were frequently observed.

Since the methods advocated for this condition had failed, an attempt was made to devise a method that would block the escape of duodenal contents. Packing was considered as holding the possibility of success provided something was used about the packing to prevent leakage. A report on the treatment of leg ulcers with whole blood[9] gave sufficient impetus to try whole blood and packing empirically. Twenty days postoperatively (15 days after the diagnosis of duodenal fistula had been established), this method was initiated.

The method devised is simple. From 3 to 5 cc. of the patient's blood is procured from an arm vein in a sterile syringe. The abdominal wound is wiped thoroughly dry with gauze, and 2 cc. of blood is sprayed into the bottom of the wound. A wad of cotton is firmly packed against the sinus or sinuses at the bottom of the wound. A little more blood is sprayed around the periphery of the cotton packing. Several layers of cotton may be used, and each time blood is sprayed at the periphery; enough cotton is employed to fill the wound flush with the skin. Two straps of adhesive plaster are applied not too firmly. In this case the wound was so excoriated that no adhesive was used for several days. The outer dressing is changed daily, but the packing is removed every 2 or 3 days.

Following the institution of this method, a marked change was evidenced. During the next 48 hours only serous dampness was noted on the abdominal dressing. The patient's general condition improved, and her appetite and strength likewise increased. On removing the packing it was found to be firmly adherent to the walls of the wound, and healthy granulations were evident. A biopsy specimen from the wall of the fistula was submitted for pathological examination, which was reported as follows:

> One corner of the specimen shows stratified squamous-cell epithelium. Underlying and at the margin there is a layer of granulation tissue densely infiltrated with lymphoid cells, polymorphonuclear leukocytes and a few eosinophils. The tissue is moderately vascular. Diagnosis: granulation tissue (Fig. 1).

From then on the wound was repacked every 48 hours. The patient improved steadily and the skin slowly healed. She was out of bed and walking about on September 6, and was discharged on September 12, 34 days postoperatively. At the time of discharge the hitherto gaping abdominal wound was about half its original size and a firm packing was left in situ. From then on convalescence was uninterrupted, with complete healing of the fistula 3 weeks later.

Discussion

Closure of the duodenal defect in duodenal fistula may be accomplished either by operative or by nonoperative measures.[10] Operative procedures have not been encouraging in that surgical intervention is usually carried out at a time when the patient's condition is extremely poor. For such reasons most writers agree that surgery should be reserved for selected cases.[11] Furthermore, most authors are in accord that at present the best hope in dealing with this aggravating complication lies in palliative and conservative measures.[12] A number of methods have thus far been advocated, each with reported successes. The basic principles underlying those generally carried out can be concisely summarized as follows:

Figure 1. *Photomicrograph of the Biopsy Specimen. Note the granulation tissue.*

Mechanical:

Elimination of positive duodenal pressure by the passage of a tube into the duodenum. This is impossible in the case of a leak from a duodenal stump after gastric resection.

Absorption of the ferments, achieved by the production of an acid medium by continuous irrigation of the wound with a tenth-normal solution of hydrochloric acid, with citric acid, or with 5 per cent solution of tannic acid.

Absorption of the ferments by the application of finely divided charcoal, kaolin or bronzing powder.

Removal of the fluids by continuous suction obtained by a tube inserted in the fistula. (In a modification of this method two tubes are used — one for irrigation of the fistula with peptone water, beef juice and the like, and the other for suction.)

Chemical:

Neutralization of the proteolytic ferments by combining them with an excess of peptone powder, protein, beef juice or similar agents, also whole milk thickened by adding acidophilus bacillus.

Protective:

Protection of the surrounding skin by the application of kaolin and glycerin ointment, boric ointment, liquid latex or the like.

In every method an attempt is made to remove the intestinal digestive contents that constantly

*Donald, not being satisfied with the methods at hand, has described a simple apparatus that he used successfully in a patient who developed a fistula from the duodenal stump twelve days after a subtotal resection of the stomach and a posterior Polya type of anastomosis. The fistula was completely obliterated eight days after the apparatus was applied. Donald's method, in brief, is as follows: A cuff is made from a round standard sputum container, the bottom of which is cut off, the container being firmly applied about the wound and strapped to the skin. A thick ointment composed of 50 per cent glycerin and 50 per cent kaolin is then heavily applied to the inside wall of the container and to the skin adjacent to the fistula. The fluid that drains into the box is aspirated once every hour and subsequently at gradually lengthening intervals, as required. When aspiration is not being carried out, the box is closed tightly by insertion of the lid of the container. The patient is then free to move about in bed as he desires.

pour out of the wound, and whenever possible to collect these juices and feed them back to the patient through an indwelling nasal tube or a jejunostomy. The use of solutions to neutralize chemically the intestinal discharges is in many cases of little value. The application of protective ointments is also of limited value, depending on the character and amount of drainage. Those who have had experience with the persistent drainage from duodenal fistulas realize the many disadvantages inherent in the above methods. Unquestionably the desirable objective is to keep the wound absolutely dry and free from digestive juices if possible, with the hope of aiding the formation of granulation tissues, thus finally obliterating the fistula.

In the present case, this objective was attained by using autogenous blood around the periphery of cotton packing within the fistulous wound. It is realized that the report of a single case is insufficient to warrant any conclusions; yet it seems certain that in this case the rapid growth of granulations obliterating the duodenal defect can be attributed to the use of whole blood.

This appears to be in conformity with the observations of Moorehead and Unger[13] on the use of residual red cells from different blood groups. They have mixed these and stored them in a refrigerator from a few days to a few weeks, obtaining a gelatinous mass. This they have used as a dressing material for wounds such as open joints, infections, burns and ulcers. The material is reported to aid the ingrowth of new tissues when applied to certain wounds. Seldon[14] has likewise used this gelatinous mass of red cells in postoperative wounds, with encouraging results. In addition, to eliminate the disadvantage of absorption by the gauze, he has evolved a method of reducing the semiliquid mass of red cells to a fine powder, which is dusted on the wound or applied by a spatula. Seldon's report is encouraging in that the postoperative period is materially reduced.

Summary

Duodenal fistula and its treatment is briefly discussed, and a case is presented.

The treatment of this case by whole blood, topically applied, is described, and the result obtained is discussed.

It is hoped that this method may be applied by others in this trying and serious condition.

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MEDICAL PROGRESS

PARENTERAL-FLUID THERAPY*

I. Estimation and Provision of Daily Maintenance Requirements

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THE last fifty years have witnessed a steady increase in knowledge concerning the metabolic disturbances resulting from starvation and dehydration. In addition, the increased availability of a variety of parenteral solutions and specific nutrients has increased not only the possible effectiveness of parenteral nutrition and repair therapy but also the physician's responsibility in the administration of parenteral fluids. The purpose of this review is to present in outline form such basic data as may be helpful in effectively utilizing this knowledge in the provision of the parenteral therapy that is at hand today or may become available tomorrow. The first part deals with the estimation and parenteral provision of the daily maintenance requirements of patients who cannot be nourished enterally. The second part will cover the estimation of losses incident to dehydration and the provision of parenteral repair therapy.

TABLE 1. *Approximate Normal Water Losses and Allowances* per Day for Persons of Varying Size Not Subject to Exertion or Sweating.*

SIZE	WATER LOSS				USUAL WATER ALLOWANCES		
	URINE	STOOL	INSENSIBLE	TOTAL			
	cc.	*cc.*	*cc.*	*cc.*	*cc./person*	*cc./kg.*	*oz./lb.*
Infant (2–10 kg.)	200–500	25–40	75–300†	300–840	330–1000	165–100	2.5–1.5
Child (10–40 kg.)	500–800	40–100	300–600	840–1500	1000–1800	100–45	1.5–0.7
Adolescent or adult (60 kg.)	800–1000	100	600–1000‡	1500–2100	1800–2500	45–30	0.7–0.5

*Including the water content and water of oxidation of food, which under normal circumstances, except for infants, approximates the insensible water loss.

†1.3 cc. per kilogram per hour. [2]

‡0.5 cc. per kilogram per hour. [3]

ESTIMATION OF DAILY MAINTENANCE REQUIREMENTS

A consideration of maintenance requirements is an obvious prerequisite to logical parenteral maintenance therapy.

Table 1 presents the approximate daily water losses of normal infants, children and older persons who are not performing work or sweating. It should be noted that the infant has a greater water loss per kilogram of body weight than does the adult. His greater insensible loss[1,2] is associated with his relatively larger surface area and higher metabolic rate; and his greater urine volume per kilogram reflects the infant's higher metabolic rate and his relatively greater load of catabolites presenting for urinary excretion. These large volumes may also be due to a somewhat limited concentrating ability of the kidneys.[3,4] The urine volumes given in the table appear adequate to provide the volumes required to excrete the increased total osmillimoles[5] that may present for renal excretion incident to operation, traumatic shock, fever, starvation or the debility of illness.[6–13] Patients with a renal impairment that limits concentrating ability may have an obligatory renal water loss that is 100 per cent greater than those given in the table.[14] Moreover, insensible water losses as much as 100 per cent above those recorded in the table may be sustained by patients suffering from operation, fever or debility.[15–18] As such abnormal losses are not unusual for patients requiring parenteral therapy, their occurrence demands appropriate extra allowances of water above those listed in Table 1. Extreme extrarenal water losses (2000 to 5000 cc.) may be suffered by patients subject to high environmental temperatures.[1,19–22]

The data of Tables 2 and 3 approximate the normal daily allowances of sodium chloride and the daily basic caloric, carbohydrate and protein requirements for persons of various sizes lying in bed and thus inactive. Worthy of special note is

TABLE 2. *Approximate Normal Sodium Chloride Maintenance Allowances Per Day for Resting Nonsweating Persons of Varying Size.*

SIZE	SODIUM CHLORIDE	PHYSIOLOGIC SALINE SOLUTION
	gm.	*cc.*
Infants	1	125
Children	3	350
Adolescents and adults...	6	700

*From the Children's Medical Service, Massachusetts General Hospital, and the Department of Pediatrics, Harvard Medical School.

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the fact that such daily sodium chloride needs of infants and adults are satisfied respectively by approximately 125 and 700 cc. of physiologic saline solution. The therapeutic implication of these small maintenance needs of saline solution has been emphasized.[15–17,23–25] Should all the infant's or adult's parenteral fluid contain 0.85 per cent of sodium chloride, each would obtain approximately 6 or 22 gm. respectively of the salt per day. Such an excess of parenteral solution often results in fluid retention and in a urine volume that is extremely small relative to the fluid intake.[15–17,26] This normal response is not infrequently falsely interpreted as an indication for more fluid or of circulatory failure or renal insufficiency. In patients receiving a sulfonamide, such an oliguric response to excessive saline solution may be attributed to a deleterious effect of the drug on the kidneys and may result in the discontinuance of a highly desirable therapy. If, on the other hand, the drug is continued, the low urine volume may actually result in an avoidable sulfonamide hematuria — avoidable because the infusion of the same volume of proper parenteral fluids would have provided a urine volume sufficient to allay such a complication.

Whereas the provision of water and sodium chloride allowances is readily accomplished parenterally, the parenteral administration of the normal caloric and protein allowances present more difficulty.

Because in the past dextrose has been more readily available than amino acids, protein or fat for parenterally satisfying caloric requirements, it has usually been used as the source of the major portion of the calories supplied by this route. In so far as parenteral dextrose has satisfied the caloric needs, it has reduced body tissue and nitrogen loss and accomplished a body-protein sparing effect. Today, however, at least the basic protein needs can be readily met by such amounts of parenterally administered amino acids as specified in Table 3.[8,27–33] The allowances of dextrose given in the table are those required to approximate the basic caloric requirements and thus theoretically effect minimal nitrogen or amino acid requirements. The reduction of protein metabolism to such minimal levels should limit the specific dynamic action of protein and the metabolic rate and provide an economy in both the renal and extrarenal loss of water.[1,11] Excessive intravenous dextrose should, however, be avoided because of the possibility of overburdening the liver[34] and of inducing an undue hyperglycemia, glycosuria and polyuria. Again, as mentioned in considering Table 1, the allowances of Table 2 and the requirements of Table 3 do not include the repair of losses incident to shock, trauma or illness.

The provision of the protein allowances specified in Table 3 can be accomplished by whole blood or plasma transfusions and the infusion of solutions of amino acids. In the presence of a significant anemia, whole-blood transfusions are specifically indicated. Plasma transfusions should be employed in the presence of a reduced plasma volume and increased red-cell count, hematocrit or hemoglobin concentration. Although mixtures of the pure amino acids that provide the ten essential to man, together with glycine, have been shown to be effective in maintaining nitrogen balance[35,36] and to be nontoxic even when injected rapidly,[36,37] such mixtures are not as yet available for general use. A commercially available enzymatic hydrolysate of casein and pancreatic tissue providing approximately 80 per cent of the total nitrogen as amino acids and 20 per cent as dipeptide* has been shown to be effective in the parenteral provision of basic nitrogen allowance[8,27–31,33] and superior to such acid hydrolysates as are available for general use today.[37–39] The enzymatic hydrolysate, however, has definite limitations. If it is infused at more than a moderate rate, nausea, vomiting, hyperpyrexia, polyuria and thrombosis of the vein and edema of the extremity receiving the infusion may occur.[8,28–31,33,40] Such reactions and the fact that urinary nitrogen may be double that which pertains with the infusion of equivalent amounts of plasma[41] suggest that this preparation might be improved. For the present, reasonable prerequisites to the parenteral administration of amino acids appear to be as follows.

The patient must be unable to ingest sufficient food enterally to meet his caloric and protein requirements.

TABLE 3. *Approximate Daily Caloric Requirements of Normal Resting Persons of Varying Size, Together with the Daily Dextrose and Amino Acid Allowances* That Theoretically Might Satisfy Them.*

SIZE	DAILY CALORIC REQUIREMENT	DAILY DEXTROSE ALLOWANCE		DAILY AMINO ACID ALLOWANCE	
	cal./kg.	*gm./kg.*	*cal./kg.*	*gm./kg.*	*cal./kg.*
Young infants	60	14	54	1.5	6
Old infants	55	13	51	1.0	4
Children	30	7	28	0.6	2
Adolescents and adults	25	6	24	0.6	2

*Available evidence suggests 6 gm. of nitrogen or 40 gm. of amino acid as a reasonable daily allowance for the adult; that for estimating the daily allowances for young resting patients on a high carbohydrate diet is meager.

*The amino acid product known as Amigen (Mead, Johnson and Company).

His basic caloric requirements as specified in Table 3, must be covered sufficiently by parenteral dextrose,[37] with or without fat, properly emulsified for intravenous administration[42–46] to accomplish effective sparing of endogenous nitrogen.

The amino acids should be added to the parenteral dextrose solutions so that their concentration in the infusion does not appreciably exceed 3.5 per cent and so that the reaction of the solution is approximately pH 6.5.[8,33] The volume and dextrose content of the infusion will then prescribe a rate that will limit such reactions as listed above.

The total amount of amino acid thus administered should depend on the estimated nitrogen loss sustained by the patient, whose endogenous nitrogen metabolism is being kept minimal by the intravenous infusion of such dextrose and possibly fat as can be effectively utilized. Under such conditions the average daily nitrogen loss in the adult may approximate 6 gm. but may vary from 4 to 20 gm.[6–11,39] Therefore, approximately 40 gm. of amino acids (40÷6.25=6.4 gm. of nitrogen) will be required per day to cover the average nitrogen loss. In exceptional circumstances double the above requirements of amino acids may be included in the dextrose infusion.

Figure 1 shows the quantities of intravenously administered physiologic saline solution, 5 per cent amino acids and 10 per cent dextrose that will cover the daily water, salt, caloric and protein requirements of infants as given in Tables 1, 2 and 3. It is seen that, if the caloric requirements are to be provided, all the fluid must contain 10 per cent dextrose unless the water intake is to be excessive or unless fat or more amino acids are included in the infusion.

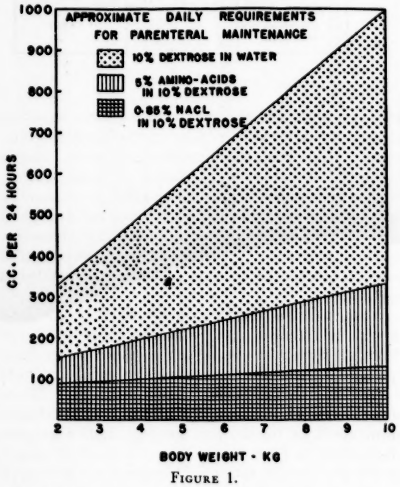

FIGURE 1.

Figure 2 depicts the amounts of such intravenous fluids that will cover the daily requirements of patients who are heavier than those included in Figure 1. The dextrose concentration has been increased to 15 per cent, since provision of the dextrose allowance (Table 3) by a 10 per cent solution would require the infusion of excessive fluid unless the patient is so dehydrated as to need many cubic centimeters of extracellular fluid or unless fat or more amino acids are included in the infusion.

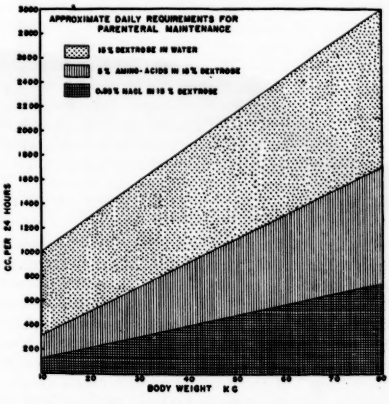

FIGURE 2.

Because thiamine deficiency may occur within a period of two weeks[47,48] and because the thiamine requirements may be proportional to the carbohydrate intake,[49] it seems reasonable to add from 2 to 5 mg. of thamine per day — depending on the size of the patient — to the glucose infusions. Although there is evidence[39] that vitamin deficiencies other than that of thiamine do not develop within several weeks, pre-existing nutritional deficiency or infection may suggest the advisability of providing 0.5 to 0.3 mg. of riboflavin, 5 to 30 mg. of niacinamide and 30 to 100 mg. of ascorbic acid per day. Since these vitamins are unstable in alkaline solution, they should not be added to alkaline solutions.

To support and supplement such maintenance therapy, whole-blood or plasma transfusions should be given as specifically indicated by anemia or by a low concentration of serum proteins.[50–52] If parenteral therapy is required for more than four or

five days, the desirability of a transfusion of 10 cc. of whole blood or 15 cc. of plasma per kilogram of body weight should be considered. Unless the hemoglobin concentration of the blood is above normal, whole-blood transfusions appear to sustain blood and plasma volumes better than do plasma transfusions.[53–55]

Finally, even though such parenteral therapy includes amino acids and vitamins as specified above, it is nutritionally inadequate as regards many intracellular needs, so that the desirability of starting, as soon as possible, oral feedings that supply these intracellular needs should be constantly kept in mind.[52] Fat-free beef broth and small amounts of milk diluted with an equal volume of water or with some such fluid as ginger ale provide appropriate initial oral nourishment.

Manner and Rate of Parenteral Administration

If such are the types and amounts of parenteral fluids required to support the daily maintenance requirements, how should they be administered? Since only solutions given intravenously should contain more than 2.5 per cent dextrose, provision of sufficient dextrose by clysis to provide the basic calories is impracticable. The limitations of so-called "sets" of short infusions and clyses as compared to continuous-drip infusions are illustrated for the infant in Figure 3 and for the adult in Figure 4.

It is readily seen in Figure 3, column A, that a continuous infusion such as that outlined for the 5-kg. infant in Figure 1 closely approximates 100 per cent of the daily water, sodium chloride, caloric and protein requirements. On the other hand, as shown in column B, two short infusions of 20 cc. per kilogram of 10 per cent dextrose in distilled water and two clyses of 30 cc. per kilogram of 0.85 per cent saline solution provide only 85 per cent of the water and 30 per cent of the caloric requirements while overdosing the infant with 260 per cent of the sodium chloride requirement. The substitution of 2.5 per cent dextrose in 0.45 per cent sodium chloride solution as given in column C, for the saline clyses of column B reduces the excessive sodium chloride to 130 per cent of the requirement but still provides only 40 per cent of the daily caloric and 85 per cent of the daily water requirements. Thus, for infants, intravenous infusion is the route of choice in the parenteral provision of the daily requirement of those for whom enteral nutrition is contraindicated. The infusions are usually given most successfully into a scalp vein, the head being immobilized by sandbags and the arms and body by blankets or restraints.[56]

In Figure 4, column E, it is seen that three clyses of 0.85 per cent saline solution, 12 cc. per kilogram, which provide an appropriate water intake, exceed the sodium chloride requirement by 320 per cent and provide no calories whatever. If the clyses contain 2.5 per cent dextrose in 0.45 per cent sodium chloride solution (column F), the sodium chloride still exceeds the requirement by

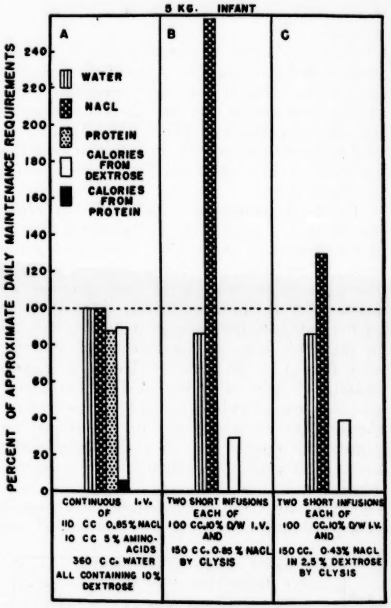

Figure 3.

160 per cent, whereas the calories have been increased to only 14 per cent of the daily requirement. Therefore, the provision of more calories requires the intravenous infusion of some glucose. Since a continuous drip, such as given in column D, satisfies the requirements of water, sodium chloride, calories and amino acids, resort to clyses together with small infusions in the provision of maintenance needs to adults should be avoided if possible.

What, then, is the rate at which these infusions should be administered? It has been suggested that only 10 to 12 gm. of dextrose can be oxidized per hour by an adult and that this rate prescribes a limit to the desirable rate of infusion.[57] If so, only 288 gm. of dextrose should be given a 60-kilogram adult in twenty-four hours. If this amount of dextrose is given in 2600 cc. of fluid, it means an 11 per cent solution of dextrose administered at the rate of 1.8 cc. or 32 drops a minute for twenty-four hours. Even if the rate of oxidation of dextrose by the infant is assumed to be double that of the adult, the limiting rate for a 5-kilogram

infant would be 2 gm. per hour. In twenty-four hours of continuous infusion only 48 gm. of dextrose could be provided. If this dextrose were provided in the 700 cc. of daily fluid requirement, the concentration of dextrose would be approximately 7 per cent and the rate of infusion 0.5 cc. or 9 drops per minute for twenty-four hours. Thus, for both adults and infants, only approximately 70 per cent of the basic daily calories can be provided by parenteral dextrose if such immediate oxidative capacity is the limiting factor. Infusion rates above these limits appear to be accompanied by an increased storage of glycogen and possibly fat[58-61] such as occurs when similar amounts of carbohydrate are ingested orally. Since most patients receiving parenteral-fluid therapy have suffered some nutritional depletion, the infusion of dextrose at rates that exceed those of its immediate oxidative utilization may be beneficial rather

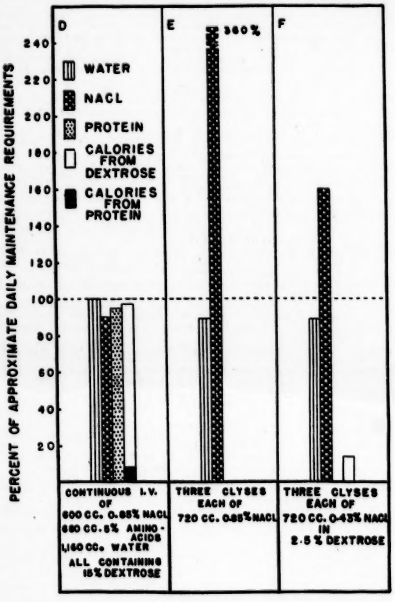

FIGURE 4.

than harmful if the infusion results in only moderate hyperglycemia and glycosuria without cardiac embarrassment or pulmonary congestion and if the daily amount of dextrose so given does not exceed the daily caloric requirement.[34]

It has been suggested[23,58,61] that dextrose may be infused for six to twelve hours at a rate of approximately 0.8 gm. per kilogram per hour without significant hyperglycemia and glycosuria. For the 60-kilogram adult this would mean 48 gm. of dextrose (not 10 to 12 gm.) per hour. Thus, eight hours of infusion would provide 384 gm. and the basic caloric needs of approximately 1500 calories as given in Table 3. Obviously, the continuation of such a rate of dextrose infusion over longer periods of time would provide excess dextrose and calories (48 gm. $\times$ 24 = 1052 gm. or 4200 calories) and might result in considerable glycosuria.[23,34,58,59]

Acceptance of 0.8 gm. per kilogram per hour as the upper limit of desirable rate of dextrose infusion means that the infusion of such a daily requirement as 70 gm. of dextrose in 700 cc. of fluid to a 5-kilogram infant requires a continuous drip containing 10 per cent dextrose at approximately 0.7 cc. or 13 drops per minute for seventeen hours. For the 60-kilogram adult, the infusion of a daily requirement of approximately 400 gm. of dextrose in 2600 cc. of fluid requires a drip containing approximately 15 per cent dextrose at approximately 5 cc. or 90 drops per minute for nine hours. Since the infusion of 10 to 20 cc. of 5 per cent dextrose per minute for several hours has only a slight accumulative effect on the blood volume[61-63] or plasma concentration[15,16,26] of the adult, the infusion rates specified above appear rather conservative[39,58,59,61] unless infection, trauma or cardiovascular function predisposes to pulmonary edema or cardiac failure.[17,23-26,63] Somewhat more rapid rates of infusion over shorter periods, although causing a qualitatively impressive glycosuria, usually result in the urinary excretion of but 2 to 10 per cent of the dextrose injected.[59,61] In spite of the fact that such a glycosuria is generally thought to be dehydrating, its diuretic effect may be confined to a very minor increase in urine volume, sodium, chloride and other constituents above that which would usually result from the infusion in the absence of glycosuria.[17,26,59] The factors affecting the not infrequently observed variation in the degree of hyperglycemia and glycosuria resulting from such rates of infusion have not been well defined. Infection, temperature and state of nutrition probably play an important role. Since glycogen has a high potassium content,[64] the amount of potassium available for combination with dextrose may be a factor in the deposition of glycogen. The amount of phosphorus or cellular enzymes may limit the oxidative utilization as well as the storage of dextrose. Trauma may affect carbohydrate metabolism as much as it does that of nitrogen.[59,65,66] Even though the daily requirements may be given to the adult in nine hours with but little glycosuria, a better utilization of the water and other constituents and greater comfort of the patient might be obtained by administering half the daily requirement by an infusion from 8 a.m. to 12:30 p.m. and the remaining half by an infusion

from 6 to 10:30 p.m. If a single infusion is given for only nine of the twenty-four hours, a slower excretion and more desirable utilization of the fluid infused may be obtained by administering more sodium chloride.

Until information pertaining to these and other factors concerned with the optimal utilization of parenterally administered nutrients is available, the prescription of the rate of infusion and composition of parenteral fluids for a given patient must reflect common sense, careful clinical observation and a tolerance indicative of an enlightened awareness of ignorance.

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NEW HAMPSHIRE MEDICAL SOCIETY

PROCEEDINGS OF THE ONE HUNDRED AND FIFTY-THIRD ANNIVERSARY

House of Delegates, May 15 and 16, 1944 (Concluded)

Report of the Committee on Medical Economics

New Hampshire Physician Service

In conjunction with the officers of the Society, the committee has continued its efforts toward the setting up of a medical-service program in New Hampshire in accordance with the instructions given to the committee at the last regular meeting of the House of Delegates. Since then progress reports have been presented at two special meetings of the House of Delegates and the approval of the House secured on each occasion. The proposals of your committee on a medical-service program have now been put into concrete form as outlined below:

Present status. The New Hampshire Physician Service has been legally incorporated under the laws of New Hampshire, your committee, with the addition of Attorney Frank J. Sulloway, acting as incorporators. The incorporators have elected a group of voting members of the corporation, and these in turn have elected a Board of Directors. Since the enabling act specifies that a majority of the Board of Directors shall be approved by the New Hampshire Medical Society, it will be the duty of the House of Delegates at this session to vote on the list of directors submitted to it.

Subscriber contracts and physician contracts have been drawn up and copies of these sent to each member of the New Hampshire Medical Society. The program has been explained and discussed before each county medical society by a member of your committee, and the signed contract of the individual physicians together with subscription toward a capital fund has been solicited. Another provision of the enabling act requires the participation of at least 50 per cent of the physicians in any given area before the plan can be put into operation in that area.

Organization of the corporation. The corporation consists of three classes of persons: voting members, subscribing members and participating physicians.

Voting members consist of not less than fifteen nor more than thirty members of the New Hampshire Medical Society and not less than fifteen nor more than thirty representatives of the general public, the numbers from the two groups being equal. The original voting members are elected by the incorporators and the body is then self-perpetuating.

A subscribing member is any person who subscribes to the capital fund of the organization.

A participating physician is any physician holding a license to practice medicine in New Hampshire who is a member in good standing of the New Hampshire Medical Society, and with whom the corporation has a contract under the medical-service plan.

The Board of Directors, consisting of not less than seven nor more than seventeen members, is elected annually by the voting members of the corporation. A majority of the directors must be approved by the House of Delegates of the New Hampshire Medical Society.

The Professional Committee, consisting of not less than three members of the Board of Directors and the majority of the committee being members of the New Hampshire Medical Society, has supervision over all medical aspects of the Plan.

Subscriber contract. Contracts are written on an indemnity basis whereby the subscriber receives a specified allowance against the bill rendered by the physician. Such allowances are made in accordance with a published schedule of benefits. It is to be emphasized that this is not a fee schedule. The physician's fee is arranged between the patient and the physician as at present, subject only to the moral obligation on the part of the doctor when dealing with a patient in the low-income group to set a fee approximately equal to the benefit allowed.

The surgical contract provides for the payment of the stated benefit in the event of surgical care received in home, office or hospital. In addition, an allowance of $10 is made for anesthesia for any one illness, one of $25 for diagnostic x-ray examination, and one of $15 for laboratory examinations in any contract year, it being provided that these diagnostic examinations must be directly related to the surgical condition.

Medical indemnity is provided as a rider to the surgical contract. It furnishes an allowance of $2 for each office and hospital visit and $3 for each home visit in any nonsurgical condition. The first two calls in any one illness are excluded, and not more than twenty-five visits are allowed to the subscriber per year, nor more than fifteen visits to a dependent. In addition, the allowance for x-ray and laboratory examinations is made available for medical as well as surgical conditions.

Physician contract. The physicians agree to provide services to subscribers under the contract, and the corporation agrees to reimburse them in accordance with the schedule of benefits. The physician further agrees that if the money available for the payment of physicians' bills is less than the total amount of the bill, he will accept a pro rata payment of the indemnity.

Capital fund. It is estimated that a capital of $10,000 to $12,000 will be necessary to meet initial costs and current expenses until the volume of insurance written is sufficient to cover expenses. This fund is being raised by the solicitation of loans that shall be unsecured and noninterest bearing, and payable at the discretion of the Board of Directors when the financial condition of the corporation permits. These loans are being solicited mainly from the members of the New Hampshire Medical Society.

Comments. The plan presented has been developing over a period of three years at the instigation and with the approval of the House of Delegates of the New Hampshire Medical Society. It is interesting to note that the American Medical Association and the National Physicians' Committee are now urging the establishment of medical-service plans by component medical societies.

In regard to the specific details of the plan proposed, the indemnity type of contract was decided on because it makes no interference with the present physician-patient relation, either professional or financial.

The feasibility of providing surgical and medical care in the hospital has been demonstrated by various plans now in operation. The advisability of extending surgical care coverage to the home and office is less widely accepted.

The inclusion of medical care in the home and office is frankly experimental. It has been shown by past experience in such plans that the majority of people are interested in protection against major illnesses that may be catastrophic for them, rather than in protection against minor, relatively inexpensive illnesses. Nevertheless, if the need for the provision of medical service for the low-income groups is to be fully met, complete medical coverage must eventually be provided. The medical coverage provided in the contract is an attempt to work toward this ideal. It is restricted in amount and it is sold only as a rider to the surgical contract in order to protect the financial stability of the corporation. It is hoped, however, that through this limited coverage experience will be accumulated on which to base further extension of subscriber benefits in the future.

It is to be emphasized that at the present time any medical-service plan must and should be to a certain degree experimental, if such a voluntary program is eventually to achieve any degree of success. This implies a readiness to change and adapt specific details in the light of experience accumulated as we go along. It is in this spirit that your committee has worked and will continue to work in the development of the program, and it is in this spirit that the plan should be accepted by the physicians of New Hampshire.

National Physicians' Committee

In view of the rather widespread divergence of opinion among members of the Society in regard to the program and

policies of the National Physicians' Committee during the last year, your committee makes no statement either in support or in opposition, deeming it advisable to leave this question to the discretion of each member.

Medical-Care Program for Clients of the Farm Security Administration

Because of the present favorable economic conditions the number of families participating in the Farm Security Administration Program has been materially reduced and the number of subscribers to the medical-care program in Grafton County and Cheshire County is insufficient to provide an adequate insurance base. This plan will be discontinued when the New Hampshire Physician Service becomes a functioning corporation, and coverage of this group will be included under the latter program.

LESLIE K. SYCAMORE, *Chairman*
R. W. ROBINSON
FRANCIS H. DUBE

Dr. Mullins, for the Committee on Officers' Reports, expressed the belief that this is the most important matter to come before the Society in many years. In view of its fundamental importance, and the necessity for making a correct decision, he said that it had not been deemed wise to make any specific recommendations except that the subject should be discussed thoroughly in the light of its assets and liabilities and without personal prejudice. It was felt that it was most important to maintain a united front. He added that the members of the Society should be willing to consider the points for and against this plan calmly and dispassionately, and then try to arrive at a common understanding, that acrimonious debate and criticism would lead nowhere and that judgment should be tempered by the fact that the decision reached might influence considerably the course of medical practice in the State for years to come.

Dr. Byron then spoke as follows:

I am definitely not in favor of any such plan, and I should like to open my argument with a challenge to those who think we should adopt it. I have asked several members about it, who have stated they were in favor of it, and the only answer I get is, "Well, it's a good thing."

It seems to me that it is a plan that will affect all branches of medicine by reason of the times in which we are practicing medicine. I think that it should be based on a better reason than just that "it's a good thing."

I am wondering if we aren't just a little bit overconscious of the Wagner Act and the Wagner–Murray–Dingell Bill, and of some of the reports sponsored by the National Physicians' Committee. Some of the reports have not been enlightening. I am wondering if, in adopting such a plan, we are not going directly into the path laid for us, and if we are not going to fall into the pitfalls that we don't want to fall into. If the plan fails, certainly we have a noose around our necks, and we are going to cry out for someone to pull the rope.

The plan does not begin to provide for every workman. Let us take the average workman, getting less than $2000 a year; we are not going to help him very much. We shall usurp the powers we have established, and eventually we are going to lead ourselves right into the arms of socialized medicine.

Dr. McQuesten said that he thought the position of the Hillsborough County Medical Society was somewhat misunderstood by some of the men. There were certain things about the Blue Shield that were not wanted, but the argument was not necessarily against those. He took the position that this service was not necessary, and that the argument in favor of it could not be seen.

A member stated that the practice of medicine is based on sound fundamentals. Most physicians had been going along on that basis and had made satisfactory arrangements, economically speaking, with their patients. He hated to see the medical profession going into the insurance business, and to see a split on principle.

Dr. Byron said that he thought the propaganda had made the members a little overconscious, and that they were probably assuming the defensive. He saw no justification for dealing with the situation in this way or for feeling this way about it. He added that there should really be no fear over this proposition; in fact, the act had been lying idle for some time. Dr. Fishbein had been heard to say on three different occasions that it was a threat and would disappear.

Dr. Sycamore then spoke as follows:

I have been asked the reason for such a program in New Hampshire. I think there is a definite need for an extension of medical service, because of the changing type of medical practice today. The economic burden has become greater. Fifty years ago, the physician used his own skill, and that was practically all. Today, there are so many highly technical procedures in both diagnosis and treatment that medical service is much more expensive — too much so for the average low-income patient to handle; yes, and more expensive than the physician and his fee. So that there is a definite need for a better distribution of the medical care that we have available.

There is a public demand that is growing in certain labor unions. For example, they have had a poll on this question and set up a criterion that shows a great and growing interest in this question.

It has been said that we can take care of our business ourselves. I agree. The reason why the plan is being instituted now is in the first place, that although there is no need of immediate alarm about the passage of the Wagner–Murray–Dingell Bill, most medical people believe that there is going to be some distribution of medical care in the near future, if not in the exact form of the Wagner Act, then in some form or another. At least we can be that much ahead of the possibility by making a procedure available that will be suitable to us, and we shall have something to say about what will be done, and not have it forced on us, whether we like it or not.

Another reason is this: even though the economic level of workmen is fairly high at the present time, we need experience to find out the possibilities and limitations, and we need to make experiments along this line.

As we have heard, plans have changed and plans differ, and this is the time to get some experience along that line. It will be useless to try to start a plan when the Government has passed some program of socialized medicine.

Dr. Jameson spoke as follows:

This strikes me as a very important question to consider. We know that if the states do not do something toward taking care of the low-income groups, the Government will make plans that may be more radical than the ones we are now familiar with.

We know that the general public is demanding some type of prepaid medical care. A poll showed that 75 per cent of the people wanted to have some type of medical care. In the Gallup Poll, the groups that were covered were the professional and semiprofessional people, farmers and farm managers, textile workers, clerical workers, salesmen and office and kindred workers.

It is generally believed that the general public is going to submit to some type of help in the matter of medical care. It does seem as though we could help take care of this group, the low-income group, and I think there is a great deal of

misunderstanding about it. This plan does not interfere with the doctor-and-patient relation. That is, the doctor would send in his bill for whatever he feels he is worth, whatever it should be. The allowance to be made is a certain indemnity, which the schedule shows. But I can't see why that should make any difference in the patient-and-doctor relation.

The Massachusetts plan has been working out satisfactorily, and a lot of these plans are good. Of course, I agree that if the medical profession could take care of all of these people satisfactorily, everything would be all right; but they are not satisfied. One of the strongest organizations is the labor group, and they are in favor of governmental control of medicine.

I feel that it would be a wise thing to try this plan, because if we wait until the Government takes it over, we shall be too late. If we wait until incomes drop down, we shall be too late. Of course, it is a pleasure to find people able to pay their bills. But as soon as the war is over, that is going to be different.

Dr. Robinson thought that the greatest question regarding the plan was whether it would actually furnish medical care to the low-income group. These plans had not been successful in reaching a sufficient number of people to make them really a satisfactory arrangement. One real problem was the failure of proper education regarding these plans. He added that the people want something, but they lack the proper education.

Dr. Batt said that there seemed to be a demand for the plan in his town. There was one industry there, and an effort was being made to have a prepayment plan of some sort. The workers intended to organize themselves without the assistance of the medical profession, and it seemed certain that the plan adopted would be the Blue Shield. Everyone, he said, seemed to agree that some plan was necessary for the low-income brackets.

Secretary Metcalf spoke as follows:

I went to Nashua to see Dr. Rock and various other men, because there was evidently widespread opposition there, which the committee had not encountered elsewhere. I was interested in the fact that the Nashua Medical Association had presented to other counties a set of resolutions opposing the Blue Shield. I put out my neck and asked them to put me on the program, not to argue the thing pro and con but to give them the facts and information.

It seemed to me after I got started that there weren't many men there who wanted information. In fact, I was told beforehand that the Nashua group had decided to bury the Blue Shield, and the barrage was heavy. The spark that set off the reaction in Nashua has not been mentioned tonight — the financial side of the plan. The Committee had evidently not emphasized sufficiently the fact that the stipends for medical and surgical care were allowances, because many men had the idea that there was a fee schedule, and that when an allowance of $75 for an appendectomy was stated, this meant that no one could charge more than that for the operation, no matter how wealthy the patient was. And there were also other misconceptions related to the same subject.

The law that was passed in the General Court reads as follows, in part:

> No license shall be issued to any medical service corporation until evidence is furnished the insurance company that at least 50 per cent of the physicians . . . are participating.

At the present time, 47 per cent of the eligible doctors in the State of New Hampshire have signed up, and there are four counties that have not yet been thoroughly canvassed. The signatures are still coming in, and by now probably 50 per cent of the doctors have signed up to participate in the Blue Shield.

Regarding the phrase "the area in which the corporation operates," I asked the Insurance Commissioner what that meant, and he said that the area in which the corporation operates is any medical center. It might be a county, or there might be several areas in the county. In other words, Nashua was a medical area, and Manchester was a medical area. Somersworth and Dover were medical areas. This being the case, we find that most of these medical areas have already signified by their votes that they favor the Blue Shield.

However, at the present time Nashua does not want it, and there is absolutely no reason why they should take it.

Some of the areas, like Newport and Claremont, have voted eleven to one in favor of it. It seems to me that any medical area, in accordance with the spirit and the letter of the law, is entitled to go ahead with the plan. Therefore, my feeling is that the House of Delegates, which has considered the subject at three general sessions and two special sessions, has no particular reason to backfire at the present time and attempt to throw the plan out of a county. I think it is worth trying out. It may not be a success. I hope that the effect of it will be to discourage the Wagnerites by showing the people that they can have decent medical care at a price that will not tap the payroll.

Dr. D. G. Smith said that Nashua was not alone in opposing the plan, and that the majority of the physicians in Manchester were also against it. As secretary of his county society, he reported that Dr. Metcalf presented the subject very well. There was a lengthy discussion, at the conclusion of which the Society voted 28 to 7 to reject the proposal of the Blue Shield. The Nashua Medical Society had voted unanimously in opposition to the New Hampshire Physicians' Service. He said that everyone appreciated the work that the Committee on Medical Economics had done, but that it was necessary to consider the attitude of the profession as a whole. He pointed out that there were only 400 practicing physicians in New Hampshire and that many of them were in the military services. He said it had been stressed that the plan should be postponed until the 125 or 130 men now in the service could have a chance to express their wishes about it. The plan must be sold to the doctors first, and if they did not want it, how could it be sold to the rest of the people? The National Physicians' Committee had stated that 25,000,000 people were now enrolled in the plan, but according to the statistics he had just heard, the number of people favoring various state plans totaled 800,000, not 25,000,000. In addition, there were other plans, such as that of the Farm Security Administration, which had quite an enrollment.

Dr. Sycamore stated that the larger figure included all types of service — Blue Cross, commercial companies and so forth.

Dr. D. G. Smith said that the demand for the plan in this state was not great. The Massachusetts plan went into operation in July, 1942, and the demand for it was decreasing. In New Hampshire, according to Dr. Sycamore's report, the need for the Farm Security Administration Plan was going down, since the number of families covered had been materially reduced.

Dr. Robinson said that that plan went into operation when the farmer was in need of it.

Dr. D. G. Smith read a passage from the report of the Board of Trustees of the American Medical Association relating to this subject, and then continued:

The American Medical Association has been urging these plans since 1943, but they have been watching them in the various states, trying to see what the best solution of the problem is. I don't believe it has yet been found. I don't believe this plan will help the low-income groups.

The question of payroll deductions will come up, and some companies will try to take care of their employees. But the employees in some places are quite upset because of the 20 per cent deductible income tax, and the social security, unemployment, Blue Cross and a lot of other deductions. Some even have deductions for life insurance, some for health and accident insurance. Whether or not employees will stand another deduction is a question.

The launching of the plan, in my estimation, is an admission of the need for it in New Hampshire. We take care of the indigent. If there is necessity for launching the Blue Shield at the present time and taking care of the medically indigent, that is one thing, and that is an argument for the Wagner Act and state medicine — in other words, it admits that the people in New Hampshire haven't been doing a good job; that there is a need for such a plan.

It was brought out in the Nashua discussions that we should not have the Society going into the insurance business. Private insurance companies are already selling insurance and taking care of the cost of medical care.

In closing, let me say that I think we should be careful in launching the boat; we should have it all built and solid, and we should have it in a place where we can launch it. It does not seem to me that we should launch the boat at this time.

Dr. Smith then moved that the New Hampshire Physicians' Service be not initiated at this time.

A member asked what the effect of the motion would be if it were carried, since he understood that the corporation had been legally formed.

Speaker Dwinell said that the people who had already accepted this plan are entitled to its service and could not be stopped by any vote.

Dr. Sycamore said he did not see how a few dissenters could presume to ask the House of Delegates to tell the members of eight counties who have already accepted the program that they should not do it.

Speaker Dwinell mentioned that he had heard no one say anything against the Blue Cross. If that had been so successful and had helped people out, why was not the Blue Shield going to help them out, too?

Dr. Robinson said that if criticism of the Blue Cross was wanted, it could be found in the records of five, six and seven years ago.

A member asked whether it was the general consensus that the Blue Shield was mainly desired as a protection against the possibility of socialized medicine.

Speaker Dwinell said that this was one reason why it was wanted.

A member suggested that the larger sections of the country that could not possibly finance any prepayment plan had been overlooked. He was referring to some of the places in the South.

Speaker Dwinell said that the plan was not intended to take care of the indigent patients who would always be taken care of by the town or the county, but was for those who had enough, but did not save it.

Dr. Wilkins took exception to Dr. Smith's statement that the plan could not be undertaken unless all the doctors were in favor of it, pointing out that some developments in medicine had become realities not because the doctors demanded them but because the public did. As examples he cited the cancer program in New Hampshire, which was actually initiated by laymen because they were interested in taking care of indigent cancer patients, and was brought to the attention of the Legislature before the medical men were consulted, and the tuberculosis program, which was brought about by a lay group, the New Hampshire Tuberculosis Association, and not by the medical profession. When the Blue Cross was first started, he said, the Eliot Hospital was the only hospital that agreed to it and subscribed to its provisions, and many of the other hospitals fought against it. Today, they were all with it. As Dr. Robinson had said, when the Blue Cross was first introduced, the same objections and the same arguments were brought up against it as were being brought against the Blue Shield, but it proved a success, and so would the Blue Shield. This House of Delegates, he continued, had discussed this matter for three years. The committee had done an outstanding and forward-looking job and had brought something to the Society that was worth while. He said the plan ought not to be turned down, but should be given an opportunity to prove its worth. Medicine was going to be practiced differently, and all must accept it. This is one of the ways in which it would be practiced. The people, he asserted, want something to cover their unusual medical expenses; otherwise, the Government will take over this matter.

Dr. Fitch was appointed as alternate delegate in the place of Dr. Lewin, who had had to leave the meeting, and spoke as follows:

I should like to express myself in opposition to Dr. Smith's motion. I think that we should go on record in regard to the insurance question now. It would be too bad to lay it on the table for another year.

Dr. Wilkins has well expressed what I have in mind: namely, that the public is ready for this program and that they are looking for the medical profession to carry it through. It has been pretty well publicized, and the public want to see it adopted.

In Claremont, the Sullivan Machinery Company has adopted the Metropolitan plan of insurance, whereby the employees pay a part of the premium and the company pays the balance, and it is very well accepted. The employees all carry private insurance.

Dr. Dye said that doctors as individuals would all like to continue practice the way they are now doing, and felt that they had done a good job. The medical standards he said were better in this country than anywhere else in the world. Nevertheless, he added, the Wagner Bill was passed, and there is still a demand by many groups for medical insurance and medical protection.

As to the Blue Shield, some people could afford to pay a small fee to protect their families when they were working, but they could not afford to pay the bills when they were sick. He said that the question was not whether the physicians wanted this plan, but whether the people wanted it. If there was a public demand for it, he asserted it would come about in one way or another. The plan, if operated under supervision, should work well. Naturally, he said, this was just the beginning, and there might be mistakes and flaws but after some cooperation those could be corrected. The Society had already endorsed this plan in a legal manner and had given the committee the power to go ahead and form a corporation. That had been done, and 50 per cent of the doctors in the State of New Hampshire had already subscribed to it. He did not see how the Society could retract.

Speaker Dwinell pointed out that the motion before the house was that the Blue Shield be rejected, and suggested a standing vote.

Secretary Metcalf said that there were 114 men in the military services and that a letter and all the literature on the plan had been sent to every one of them. These were sent to the men's New Hampshire addresses. Possibly some of the letters had not been forwarded, but some of them evidently were because he had received one reply. Out of the other 350 odd members who are residents of the State, he got three replies. The one reply from the soldier said that he was heartily in favor of the plan, and that when he got back into civil life again he would thank God it was there. Dr. Metcalf added that this physician was a member of the Hillsborough County Society.

Dr. Mullins thought that it was unfortunate that the House was voting on a negative motion. As stated in the report of the Committee on Officers' Reports, it was felt that the situation should be dealt with positively, since the Society looked to the House of Delegates for positive leadership. The delegates, he pointed out, were the elected representatives of the Society and represented the sentiment of most of the doctors in New Hampshire. He requested that the motion be withdrawn. Dr. Smith then withdrew his motion. Dr. Mullins then moved for a vote approving the action of the Committee on Medical Economics and accepting the spirit of the principles of the New Hampshire Physicians' Service. This motion was duly seconded.

Dr. Clough said there seemed to be too much feeling on both sides to pass or shelve the motion now, and suggested laying it on the table for one year. He admitted that he had many conflicting ideas on the subject, but was at present strongly against the motion, and said that he thought there were others present who felt the same way. He suggested that the motion should be worded so that if it were defeated it could be brought up again next year.

Speaker Dwinell called for a standing vote on Dr. Mullins's motion, and the motion was carried, with 4 dissenting votes.

Dr. Sycamore said that the law required that a majority of the Board of Directors should be approved by the House of Delegates. He therefore moved that the House of Delegates approve the Board of Directors. This motion was duly seconded by Dr. Dye and was carried.

The meeting then adjourned at 11:30 p.m. until 9 a.m., May 16.

* * *

The House of Delegates reconvened at the Hotel Carpenter, Manchester, on May 16, 1944, at 9:00 a.m., with Speaker George F. Dwinell, of Manchester, presiding.

The following members answered the roll call.

The President, *ex-officio*
The Vice-President, *ex-officio*
The Secretary-Treasurer, *ex-officio*
P. R. Hoyt, Laconia
Richard W. Robinson, Laconia
W. J. Paul Dye, Wolfeboro
Francis J. C. Dube, Center Ossipee
Albert C. Johnston, Keene
Richard Batt, Berlin
Arthur B. Sharples, Groveton
Leslie K. Sycamore, Hanover
Howard N. Kingsford, Hanover
Donald M. Clark, Peterborough
R. E. Byron, Manchester
Deering G. Smith, Nashua
Clinton R. Mullins, Concord
William P. Clough, Jr., New London
Gerard Gaudrault, Concord
Harry B. Carpenter, Portsmouth
Fred Fernald, Nottingham
Roland J. Bennett, Dover
George G. McGregor, Durham
Donald G. Moriarty, Newport
Emery S. Fitch, Claremont (alternate for B. Read Lewin)
George C. Wilkins, Manchester (alternate for Stillman G. Davis)
Dr. Henry O. Smith, Hudson

Dr. W. J. Paul Dye, reporting for the Committee on Nominations, proposed three men for president: Fred Fernald, Nottingham; F. E. Wilder, Whitefield; and Cleon W. Colby, Exeter.

Dr. Dye then pointed out that there were two candidates for president from the same county, which was unconstitutional, and requested another nomination in place of Dr. Colby. The name of John Hunter, of Dover, was proposed and was added to the list of nominations for president.

On written ballot, Dr. Fred Fernald, of Nottingham, was elected president.

Dr. Dye then proposed three men for vice-president: John F. Gile, Hanover; Robert W. Holmes, Keene; and Edward C. Batchelder, Dover.

On written ballot, Dr. Gile was elected vice-president.

Dr. Dye then read the rest of the slate, as follows:

Secretary-Treasurer: Carleton R. Metcalf.
Councilors:

(Two elected annually for five years)	Term Expires
Henry H. Amsden, Merrimack County	1945
Timothy F. Rock, Hillsborough County	1945
Cleon W. Colby, Rockingham County	1946
John A. Hunter, Strafford County	1946
Richard E. Wilder, Coos County	1947
W. J. Paul Dye, Carroll County	1947
Clifton S. Abbott, Belknap County	1948
Arthur W. Burnham, Grafton County	1948
Walter H. Lacey, Cheshire County	1949
Emery M. Fitch, Sullivan County	1949
Trustees:	
George C. Wilkins, Manchester	1945
Howard N. Kingsford, Hanover	1946
Samuel T. Ladd, Portsmouth	1947
Henry O. Smith, Hudson, Trustee Emeritus	

Speaker of House of Delegates: Ralph W. Tuttle, Wolfeboro.
Vice-Speaker of House of Delegates: Deering G. Smith, Nashua.
Delegate to A. M. A. 1944–45: Deering G. Smith, Nashua.
Alternate Delegate, 1944–45: Emery M. Fitch, Claremont.
Necrologist: Henry H. Amsden, Concord.

Standing Committees

Advisory Committee on Jurisprudence: Clifton S. Abbott, Belknap County; W. J. Paul Dye, Carroll County; John J. Brosnahan, Cheshire County; Richard E. Wilder, Coos County; John F. Gile, Grafton County; David W. Parker, Hillsborough County; Robert J. Graves, Merrimack County; Samuel T. Ladd, Rockingham County; Jeremiah J. Morin, Strafford County; Henry C. Sanders, Jr., Sullivan County; Carleton R. Metcalf, Concord, Chairman.
Amendments to Constitution and By-laws: W. J. Paul Dye, Frederick S. Gray, Ralph N. Jones.
Child Health: Colin C. Stewart, Jr., B. Read Lewin, Franklin N. Rogers.
Control of Cancer: George C. Wilkins, Ralph E. Miller, George F. Dwinell.
Maternity and Infancy: Robert O. Blood, Benjamin P. Burpee, Marion Fairfield.
Medical Economics: Leslie K. Sycamore, Richard W. Robinson, Francis J. C. Dube.
Medical Education and Hospitals: John P. Bowler, James W. Jameson, Herbert L. Taylor.
Medical Preparedness: Deering G. Smith, Ezra A. Jones, Carleton R. Metcalf.
Mental Hygiene: Benjamin W. Baker, John B. McKenna, Simon Stone.
OPA Assistance: Charles H. Parsons, Alexander Barbeau, Philip McQuesten.
Public Health: Harris E. Powers, Anthony E. Peters, Clinton R. Mullins.
Public Relations: The President, the Vice-President, the Secretary-Treasurer, Robert J. Graves, Joseph N. Friborg.
Publication: Carleton R. Metcalf, John F. Gile, Emery M. Fitch.
Scientific Work: Carleton R. Metcalf, Frederic P. Scribner, Sven Gundersen.
Tuberculosis: Robert B. Kerr, Richard C. Batt, Charles H. Parsons.

The Secretary was instructed to cast one ballot for the remainder of officers and committee members, as nominated; this was done, and all were declared duly elected.

Report of the Committee on Memorials and Communications

The committee has two matters to take up. We have one communication from the Office of Price Administration in connection with the rationing of special food for the sick people. The OPA wants the Society to appoint a committee to see that the sick person really is sick, and really needs special food rations. They want to see that the sick people have what they should have, but they want to understand that the person really needs it.

The committee is in favor of this proposition from the OPA, and recommends the following committee: C. H. Parsons, Concord; Alexander Barbeau, Manchester, and Philip McQuesten, Nashua.

I also have a communication from the Medical Association of Southern California relative to the House of Delegates of the American Medical Association. It seems that the minimum number of delegates from a state is one, the more populous states having twenty or more delegates. The recommendation from the Southern California Medical Association is as follows:

> Be It Resolved, That the House of Delegates of the Southern California Medical Association petition the House of Delegates of the American Medical Association to amend its constitution and by-laws so that the minimum number of delegates to which each constituent organization is entitled shall be two, instead of one.

In other words, each state would have at least two delegates to the American Medical Association instead of one.

Dr. McGregor did not understand how the OPA plan was going to function. He asked whether, for example, if he had a diabetic patient he must call up somebody in Nashua.

Dr. Kingsford stated that the OPA wanted a committee appointed by the Society to which the OPA could turn if the demand was not authentic or seemed unreasonable.

Dr. McGregor asked if the committee would examine the records at Nashua to see if he was right.

Dr. Kingsford said that he did not understand it in that way. He explained that the OPA had many applications from people who were not licensed doctors, and needed someone to check on them. He did not believe that the OPA sought to question anything that a regular physician did.

Dr. Robinson said that this was being done, and that prescriptions of physicians in regard to food thought necessary in particular cases were being questioned. He reported that he prescribed a diet for a patient with a severe nephrosis, and that the OPA wrote to him saying that it could allow high-protein diets only for tuberculosis.

Dr. Kingsford said that the Society should have a committee to back up its members.

Secretary Metcalf said it was just this type of case that the OPA wanted to refer to a group of three doctors. He said that there were relatively few cases where the matter came into question at all, but that every once in a while the OPA got a case in which it did not know whether to say "yes" or "no." It would like some responsible committee from the New Hampshire Medical Society to which it could refer such a case for advice, not wanting to pass on it themselves for fear that whatever they said would be unjust. According to the OPA there were only two or three such cases a month.

Dr. Sycamore moved that the committee, as named, be constituted to co-operate with the OPA. This motion was duly seconded and was carried.

Speaker Dwinell said that the second part of the committee report should be discussed by Dr. D. G. Smith, since he knew more about the constitution

of the American Medical Association than did the rest of the delegates.

Dr. Smith said that the allotment of delegates to the various states was based on the number of members in the state medical society — possibly one delegate to every nine hundred members, with the proviso that each state was to have at least one delegate.

He said he did not see the point of the resolution requesting that each state should have a minimum of two delegates since this would make the membership undemocratic, the representation not being according to the number of members. He moved that the matter be tabled, since it required no action by the House. This motion was duly seconded and carried.

Dr. Clark proposed a vote of thanks to the Manchester doctors for their cordial hospitality, and moved that next year the meeting of the House of Delegates be held in Manchester. This motion was duly seconded and was carried.

The second and final meeting of the House of Delegates was adjourned at 9:45 a.m.

CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

Weekly Clinicopathological Exercises

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor**

BENJAMIN CASTLEMAN, M.D., *Acting Editor*

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CASE 30431

PRESENTATION OF CASE

First admission. A sixty-year-old woman was admitted to the hospital because of swollen joints.

The patient had had the usual childhood diseases, including measles, diphtheria, pertussis and scarlet fever. At nine years of age she had "St. Vitus dance." She was subsequently in good health, but at the age of twenty-two she had pain, swelling and tenderness in the left elbow for a short period. The following year, thirty-seven years before entry, and immediately following the birth of her second child, she developed migratory joint involvement, with pain, redness, tenderness and swelling lasting for six months. She was then asymptomatic until twenty-three years prior to entry, when following the birth of her fifth child, she again developed migratory joint pains. At that time a presystolic murmur and thrill were heard, as well as a loud apical first sound. The joint pains disappeared in two or three weeks. She was otherwise symptom free until two years prior to entry, when she had palpitation and dyspnea on exertion and was put on digitalis for several months. Four months before entry she developed sore throat, headache and general malaise, which persisted despite bed rest until two weeks before admission, at which time she experienced pain and swelling of the first and second metacarpophalangeal joints and the left ankle, as well as persistent pain and stiffness low in the back. She had some dyspnea on exertion but no fever.

*On leave of absence.

Physical examination showed a well-developed, well-nourished woman lying flat in bed and in no discomfort. There was slight edema of the left ankle. The thyroid gland was enlarged and showed a small tender nodule measuring 2 by 2 cm. in the left lobe. The left border of cardiac dullness was 10 cm. to the left of the midline. The sounds were of fairly good quality. There were apical systolic and diastolic murmurs, and a diastolic thrill. The pulmonic second sound was greater than the aortic. The lungs were clear. The abdomen was normal. The second metacarpophalangeal joints of both hands were swollen, red and extremely tender. Pain and tenderness were elicited on motion of the knees and ankles.

The blood pressure was 140 systolic, 80 diastolic. The temperature was 98.6°F., the pulse 96, and the respirations 20.

Examination of the blood showed a red-cell count of 4,610,000, with 90 per cent hemoglobin. The white-cell count was 6800. The urine and stools were normal. The uric acid was 2.1 gm. per 100 cc., and the sedimentation rate 1.21 mm. per minute. An electrocardiogram showed normal rhythm, with a rate of 85, a PR interval of 0.28 second, slight slurring of the QRS complexes, normal T waves and slight left-axis deviation. The basal metabolic rate was +39 per cent.

X-ray studies of the chest showed dense dullness at the right apex, with mottling below it. The right lung field was smaller than the left, especially at the apex. The heart was enlarged to the left and down.

The patient was put to bed. Hot compresses were applied to the hands and 0.65 gm. (10 gr.) of aspirin was administered daily. She felt much better and by the end of the first hospital week was symptom free. The sedimentation rate ranged from 1 to 2 mm. per minute, with a final drop to 1.1 mm. per minute on the thirtieth hospital day. On that day an electrocardiogram showed a rate of 85, with a PR interval of 0.22 second. She was discharged at the end of the fifth hospital week.

Final admission (nine years later). Following discharge the patient apparently remained well and able to work every other day until about four years later (five years before entry), when she was seen in

the Emergency Ward following repeated episodes of hemoptysis over a period of twenty-four hours, amounting in all to about half a cupful of blood. She had had no chest pain, fever or chills. Examination showed the lungs to be clear, with bronchovesicular breath sounds in the right paravertebral region posteriorly. The left border of cardiac dullness was 8.5 cm. to the left in the sixth space. An apical, rumbling, crescendo, presystolic murmur was heard. The blood pressure was 180 systolic, 90 diastolic. The temperature was 99°F., the pulse 72, and the respirations 20. X-ray examination of the chest showed definite increase in the size of the heart since the previous examination. The enlargement was on both sides, and there was prominence of the pulmonary conus. The hilar shadows were slightly increased, and there was a marked increase of the linear markings, with areas of increased density scattered throughout both lung fields. She was advised to take it easy and rest in bed and to return in one month.

She was not seen for the next five years, except for the treatment of varicose ulcers of the leg, which healed slowly, but was apparently asymptomatic until five months before the final admission, when she noted moderate dyspnea which came on when she was out of doors or climbing but not doing strenuous work around the house. She had had occasional attacks of palpitation and felt extremely nervous. She experienced difficulty in swallowing, consisting of a sensation of discomfort, which extended over the anterior surface of the neck, and occasionally felt as if the food stuck. Examination in the Out Patient Department three months before entry revealed essentially the same findings as before. The blood pressure was 198 systolic, 118 diastolic. The pulse was regular at 80. The sedimentation rate was 0.74 mm. per minute, and the hematocrit 43. She was advised to return for admission, but refused. The dyspnea progressed in severity.

Three days before entry the patient developed weakness and general malaise. She became increasingly dyspneic, anorexic and cyanotic. Shortly before admission she experienced a smothering sensation, with marked dyspnea and orthopnea. She had no peripheral edema, chest pain, chills or fever. She was referred to the hospital after her physician had been unable to control the attack with morphine.

Physical examination showed a well-nourished, dyspneic, cyanotic woman. The neck veins were slightly distended. The lungs were resonant. There were decreased breath sounds and many moist rales in both lung fields posteriorly. The left border of cardiac dullness was 10 cm. to the left of the midline in the fifth space. There was auricular fibrillation at a rate of 120. The heart sounds were weak. A systolic murmur and a rumbling mid-diastolic murmur were heard at the apex along the left sternal border. The liver edge was felt 2 cm. below the right costal margin. A healed varicose ulcer and stasis dermatitis were present on the left leg, but there was no frank pitting edema.

The blood pressure was 120 systolic, 80 diastolic. The temperature was 99.2°F., the pulse 120, and the respirations 28.

Examination of the blood showed a red-cell count of 3,960,000, with 12.8 gm. of hemoglobin. The white-cell count was 10,400, with 85 per cent neutrophils. The urine gave a specific gravity of 1.020 and a + test for albumin; occasional red, white and epithelial cells were found in the sediment. The nonprotein nitrogen was 28.5 mg. per 100 cc., and the serum protein 6 gm.

X-ray films of the chest showed marked enlargement of the heart, the left border almost touching the axilla. The left main bronchus seemed to be elevated, probably owing to enlargement of the left auricle. The hilar vessels were slightly engorged. There were linear areas of increased density extending upward from the hilar vessels to the apices, more marked on the right.

The patient was given oxygen and 4 cc. of Cedilanid intravenously, followed by 0.2 gm. (3 gr.) of digitalis and 2 gm. (30 gr.) of ammonium chloride by mouth, with marked improvement. On the second hospital day the pulse rate fell to 56, with a subsequent rise to 80 within a few hours, and then to 100, where it remained. She was given the usual diuretic regime of ammonium chloride three times a week, with Mercupurin. An electrocardiogram on the second hospital day showed auricular fibrillation with a rate of 70. T_1 and T_2 were low, ST_1, ST_2 and ST_4 depressed, and T_3 flat and T_4 diphasic; there was left-axis deviation. The urinary output on the second hospital day rose to 2250 cc. on a fluid intake of 1000 cc. and thereafter equaled the intake. The temperature varied between 100 and 101°F. The white-cell count ranged from 7500 to 10,500.

On the third hospital day the patient was awakened from sleep by a sudden, severe, precordial pain, which was worse on deep breathing. Examination showed fine crackling rales at both lung bases. The heart was the same as before. There was tenderness in the left calf. Homans's sign was negative. The blood pressure was 180 systolic, 90 diastolic. The pulse was 100, and the respirations 30 and labored. An electrocardiogram revealed auricular fibrillation with a rate of 100. T_1 was inverted, ST_2 and ST_3 deeply depressed, T_2 upright, and T_3 diphasic; Lead 4 was normal. X-ray studies of the chest showed no change. A bilateral femoral ligation was performed. The pain apparently disappeared but the patient continued to run a low-grade fever and was moderately dyspneic and orthopneic. On the seventh hospital day she became rather suddenly unresponsive. Examination showed a marked change in the heart sounds, which were not tic-tac in quality. The systolic murmur could not be heard. The di-

astolic murmur was very faint. The extremities were cold. There was ptosis of the right eye, and both pupils were dilated and fixed to light. The right arm seemed limper than the left. No marked changes in reflexes were noted. The blood pressure was 110 systolic, 70 diastolic. The temperature fell from 102 to 99°F. The radial pulse was 80.

An electrocardiogram revealed auricular fibrillation with a rate of 120 and some change from the previous tracings, in that T_2 as well as T_1 had become inverted, with depression of ST_4 and inversion of T_4. On the following day the right arm became cold, pulseless, blue and flaccid. The right leg was colder than the left. The tendon reflexes were equal. The blood pressure was 156 systolic, 88 diastolic, in the left arm. There were signs of consolidation in the left lung base. Breathing became stertorous, the coma deepened, the temperature rose to 102°F., and the patient died on the ninth hospital day.

Differential Diagnosis

Dr. T. Duckett Jones: This case is long on paper and in years. At a young age the patient's rheumatic story began with Sydenham's chorea and followed a characteristic pattern in that heart disease did not develop until many years later after a definite attack of rheumatic fever. We have found that, in a group of reasonably well-followed chorea patients, the incidence of heart disease without other manifestations of rheumatic fever is extremely low, not over 18 per cent, after a period of eight or ten years. The incidence of heart disease in the total chorea group (including other manifestations of rheumatic fever) is about 50 per cent, as opposed to 70 per cent or more in rheumatic-fever patients without chorea.

The joint involvement after the birth of her second child seems characteristic of rheumatic fever. In our experience, patients developing rheumatic fever within three or four weeks of the termination of pregnancy have usually had active rheumatic fever in the recent past, that is, within two or three years of the pregnancy. In this case, rheumatic fever occurred one year prior to the episode after the second pregnancy. No information is given relative to any relation between the first pregnancy and the initial attack of rheumatic fever. Fourteen years elapsed, however, between the second and third clinical attacks of rheumatic fever, and the latter followed the fifth pregnancy. Since heart disease was noted initially during this attack, one wonders if mild or subclinical rheumatic fever may not have occurred at some time during the latter part of the fourteen-year period. This would help explain the interval between the two early attacks of rheumatic fever and the finding of mitral stenosis during the third attack many years later. Since presystolic murmurs are easily heard late in pregnancy, it seems probable that, if present, it would have been heard during the third or fourth pregnancies. Where there is definite evidence of rheumatic fever even without heart disease we advise the patient not to become pregnant until two or three years after the termination of the active disease.

In view of the history and findings on the first admission, we are forced to accept the fact that, at the age of sixty, after an interval of twenty-three years without clinical attacks of rheumatic fever, there was a rather characteristic recurrence of rheumatic fever. This is a rather unusual story, in fact, I believe that it is rare. It did follow a definite story of sore throat, and one wonders if intimate exposure to the hemolytic-streptococcus infections of her children and later of her grandchildren may not help explain the pattern of illnesses. There were apical systolic and diastolic murmurs and a diastolic thrill. One would presume that there was a presystolic phase (crescendo) of the diastolic murmur and that the diagnosis of mitral stenosis was justified. The sedimentation rate and the electrocardiographic findings are entirely in keeping with active rheumatic fever.

The high metabolic rate was probably due to the active disease rather than to any effect of the small nodule in the thyroid gland.

We do not know how long the active rheumatic fever continued. This adult of sixty certainly had the disease for a few months: she had it for some time prior to hospital admission and it continued at the time of discharge, as shown by the sedimentation rate and the long PR interval.

On second admission she gave a story of hemoptysis. There are several causes of hemoptysis in a rheumatic-fever patient. On rare occasions, one sees it in young people even without mitral stenosis. During active rheumatic fever, it occurs but is rare. More frequently it is associated with acute, left-sided failure in patients with old and severe rheumatic heart disease, especially mitral stenosis. This patient, however, did not have such an acute episode. There is a reasonably large group of patients in whom hemoptysis occurs purely on the basis of mechanical failure, without evidence of active rheumatic fever. I recall a few patients being followed in the Out Patient Department who repeatedly came back to the Emergency Ward or at times were admitted to the hospital because of repeated hemoptyses and who had absolutely normal laboratory findings. One wonders if this is the result of pulmonary-artery disease comparable with that reported by Parker and Weiss[1] in which there were changes in the pulmonary vessels of mitral-stenosis patients similar to those seen throughout the body in patients with arteriolar sclerosis. These authors call attention to the similarity of the changes in vessels seen in nephrosclerosis. To me it seems likelier that the majority of these patients have either small pulmonary infarcts or pulmonary thrombi, rather than actual arterial disease, as the

basis of their hemoptysis. Such patterns are variable and difficult to be sure of unless one has enough evidence to make a diagnosis of pulmonary infarction, or unless acute pulmonary edema exists.

No electrocardiogram was made at the time of the second admission. It might have helped in delineating the cause of the hemoptysis.

I presume that this patient had difficulty in swallowing—a sensation of discomfort and so forth—on the basis of esophageal distortion, which is frequent in extensive rheumatic heart disease with left auricular enlargement. There is some x-ray evidence that she had such a syndrome.

"The blood pressure was 198 systolic, 118 diastolic." This is the first time that there was increase in the diastolic pressure, and it may be significant.

A paroxysmal arrhythmia may have caused some of her trouble but there is no clear-cut indication of it.

At the time of the last admission she was sixty-nine, a ripe age for a patient with rheumatic heart disease. Heart disease was known to have been present for thirty-one years, and she lived for sixty years after chorea and for forty-seven years after the first clinical attack of rheumatic fever. At sixty-nine she had an acute episode that was severe enough to bring her to the hospital. Despite the frequent admonishment to return, she was not regular in following advice and came in only when she was distressingly in need of help.

At that time, so far as we have proof, there had been no frank active rheumatic fever since the age of sixty, although it is possible that she had active rheumatic fever at the age of sixty-four. The chief features of her difficulties at the age of sixty-four, however, were more in keeping with a heart that is failing than with rheumatic fever with failure on the basis of the active infection. I know that Dr. Castleman wants me to commit myself whether or not she had active rheumatic fever at the end, in addition to other diagnoses.

For the first time she was fibrillating, many years after known mitral stenosis.

The later findings may be a red herring in view of the developments. I might point out here that she had good basis for a thrombophlebitis, which has to be taken into consideration. She had a distinct drop in blood pressure, which usually happens at the onset of fibrillation. So long as her pressure remained elevated she did reasonably well. This has been pointed out by Dr. S. A. Levine[2] as being usual in patients with mitral stenosis. The question whether or not she had a pulmonary infarct at that time is pertinent. I presume that this was probable and that it accounted for the change on the third hospital day. The electrocardiogram showed partial digitalis effect. She had an acute episode with not only pain in the chest but something happening in the leg. One must think seriously of thrombophlebitis.

It is rather surprising that the blood pressure did not drop at the time of the acute episode. She did, however, have labored respiration and pain in the left calf. It is perfectly obvious that the electrocardiogram did not suggest a pulmonary infarct as an explanation of what had happened, and it is stated that, although x-ray examination showed no change, a bilateral femoral ligation was performed. That means, of course, that they considered pulmonary infarct as being likely, with the legs as the source, which is rather surprising to me in the presence of obvious, severe, rheumatic heart disease with failure that had been present prior to the onset of the acute episode. Severe rheumatic heart disease with failure presents unusual patterns, and one does not necessarily have to explain the clinical syndrome on the basis of pulmonary infarction or on that of another possibility, namely, a coronary accident. It is obvious that there was also a cerebral accident. There was a distinct change in electrocardiogram, which I hope Dr. Williams will comment on and which to my mind — I talked this over with Dr. Wheeler before I came in — strongly suggests that there was an accident involving the coronary system. I do not see how one can avoid this interpretation under the circumstances. The questions are, Why did it occur? and, On what basis can it be explained?

In summary, here is a story of rheumatic fever and heart disease of fifty to sixty years' duration, with an obvious decrease in cardiac reserve for a period of three, four or perhaps five years. Prior to the hemoptysis, at the age of sixty-four, a definitely low cardiac reserve existed. The sudden onset of fibrillation, with the development of failure and an unexplained acute episode a few days later, was the crux of the terminal situation. The patient had pain, a drop in blood pressure, electrocardiographic changes and evidence of multiple emboli. The question is whether or not she had a typical coronary accident. She was a sixty-nine-year-old woman and certainly this might not be unexpected, and the embolic phenomena could have come from a coronary accident. I find this rather hard to believe inasmuch as she had had obvious heart disease and a distinct decrease in cardiac reserve over a period of a few years. We know that in the failing rheumatic heart, particularly in one that fibrillates, embolic phenomena are frequent. We also know that in active rheumatic fever with heart failure embolic phenomena are rare. In some patients with failing hearts and mitral stenosis, extensive intracardiac thrombi are found at autopsy. Such thrombi are often extensive and may even extend into the pulmonary tree. There has to be some explanation for the arterial phenomena, however, and it seems to me that they fit into one pattern — an elderly woman with severe heart disease, cardiac failure and embolic phenomena. I therefore suggest the rare occurrence of coronary embolism. That may not have been the mechanism, but it could perfectly well explain the coronary accident. Ordinary arteriosclerotic disease may well have been the basis, but it seems to me that

the chances of this are rare. I believe that one would be safer to stick to rheumatic heart disease as the basis of her demise.

I presume that it is unlikely that she had active rheumatic fever at the time of death. The usual pattern of fatal progressive rheumatic heart disease results in death at an earlier age, usually fifteen or twenty years after the initial attack. I should say that there is little chance that she had Aschoff bodies; this is possible, however, since she had rheumatic fever as late as the age of sixty. I do not believe that it is necessary to predicate active rheumatic fever during her terminal illness. We know that in old people the onset of auricular fibrillation is not necessarily associated with active rheumatic fever, but it is frequent in children and young adults.

I explain the entire picture on the basis of rheumatic heart disease with extensive thrombi in the heart. There may have been some evidence of old pulmonary infarcts or thrombi. Emboli were present in the brain and the right arm at the end, and probably in the coronary arteries. The terminal coronary accident may have been on this basis rather than due to straight arteriosclerosis.

DR. LAURENCE L. ROBBINS: These films are not particularly helpful. They were taken at the time of the final admission. The patient apparently stayed out of the hospital long enough so that the early films were destroyed, and we have no way of following the course of the disease.

There is not much question about the cardiac enlargement. The left ventricle and left auricle are apparently enlarged, and there is some elevation of the bronchus with widening of the carina. I do not see anything that suggests recent infarction, at least within the lung. There is an old process in the right upper lobe to which some consideration ought to be given; it looks now like an old, tuberculous, bronchiectatic affair. There is one shadow in the right lower lung field that possibly represents an old healed infarct; it is simply a scar.

DR. JONES: When was this film taken?

DR. ROBBINS: Two days before she died.

DR. CONGER WILLIAMS: The electrocardiographic changes are not at all diagnostic of a coronary episode. One often sees quite a marked change in the terminal stages. I do not believe that one can conclude that these changes were the result of infarction. T-wave changes are present, but they are not sufficiently clear cut to be sure about them.

DR. CASTLEMAN: The electrocardiogram taken immediately after the episode was interpreted as being consistent with a recent anterior occlusion.

DR. WILLIAMS: It is a possibility, but I do not believe that one can say that it is diagnostic.

CLINICAL DIAGNOSES

Rheumatic heart disease, with mitral stenosis and regurgitation.
Auricular fibrillation.
Congestive heart failure.
Acute pulmonary edema.
Pulmonary embolus?
Cerebral embolus.
Pneumonia, left lower lobe.

DR. JONES'S DIAGNOSES

Rheumatic heart disease.
Mitral stenosis.
Auricular fibrillation.
Congestive heart failure.
Old pulmonary infarcts or emboli?
Coronary closure (? embolic).

ANATOMICAL DIAGNOSES

Rheumatic heart disease.
Endocarditis, subacute and chronic, rheumatic: mitral and aortic valves, with stenosis of mitral valve.
Atheromatosis of aorta and coronary arteries, marked.
Thrombosis of anterior descending branch of left coronary artery.
Myocardial infarction: anterior wall of left ventricle and anterior portion of septum.
Cardiac hypertrophy.
Mural thrombus: left auricle.
Embolism of axillary artery, with early gangrene: right forearm and hand.
Bronchopneumonia: right lower lobe.

PATHOLOGICAL DISCUSSION

DR. CASTLEMAN: The autopsy showed an enlarged heart (480 gm.), but one not so large as might have been expected in a patient who had had heart disease for many years. There was a mitral stenosis of moderate degree, and slight aortic disease. We could not get two fingers into the mitral valve. On the mitral valve there were small, fairly firm vegetations measuring 0.5 to 1 mm. in diameter, and above there was a mural thrombus in the left auricle. On microscopic section the valve showed an active rheumatic process; there was no evidence of palisading, but a lot of cellular infiltration and granulation tissue. The lesion was definitely older than four years, thus indicating that there had been mild rheumatic activity most of the time. The myocardium showed no Aschoff nodules. There were a few suggestive areas, and perhaps with more sections we might have been able to find a few. In the anterior wall of the left ventricle we found hemorrhagic discoloration; there was no mural thrombus over it, but it appeared softer than the rest of the myocardium and our sections show that it was a recent infarction. The coronary arteries were moderately sclerotic and calcified, and in the descending branch on the left we found evidence of recent thrombosis. I am fairly certain that it was a thrombus and not an embolus, because I do not believe

that an embolus could have gone through into the area where the occlusion occurred.

There was no recent infarction of the lung, but there was evidence of old scarring in several places, such as might have occurred with previous infarction or perhaps rheumatic pneumonia. I should favor rheumatic pneumonia rather than infarction. The arterioles in many places were markedly thickened, and the media showed hypertrophy of the muscle cells.

The liver showed a mild degree of failure.

DR. JONES: Do you think it likely that, if she had not had the coronary accident, she would have followed the pattern of an early fibrillator and have gone on for many years?

DR. CASTLEMAN: She did have a mural thrombus in the left auricle.

DR. JONES: Yes; but probably all fibrillators do at the onset. They need not be extensive.

DR. JAMES NEIL: Were there any emboli or thrombi in the major cerebral vessels to explain the paralytic symptoms?

DR. CASTLEMAN: We have not yet examined the brain; she probably had small emboli.

REFERENCES

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2. Levine, S. A. *Clinical Heart Disease.* Second edition. 495 pp. Philadelphia and London: W. B. Saunders Company, 1940. P. 52.

CASE 30432

PRESENTATION OF CASE

A forty-six-year-old man entered the hospital because of hematuria.

The patient had been in good health until nine years before entry, when he first noted blood in his urine. The bleeding was intermittent and painless. It would continue for two or three days and stop for one to four weeks. There were no clots. He was seen at a community hospital, where a left nephrectomy was performed for a papilloma of the left renal pelvis. Following the operation he was asymptomatic for five years, at the end of which time hematuria recurred. He was cystoscoped; and a tumor in the region of the left ureteral orifice was fulgurated. He subsequently had ten or twelve recurrences of hematuria, with repetition of the treatment. Following each treatment he was asymptomatic for two to five months. He was again cystoscoped. The left ureteral orifice and a surrounding area 1 to 2 cm. in diameter were firm, slightly red and granular; no definite papilloma was seen.

Physical examination showed a well-developed, well-nourished man in no distress. The lungs were clear. The heart was not enlarged. The sounds were of good quality and regular. A soft, blowing, Grade I aortic systolic murmur was heard, which was transmitted to the neck. The abdomen was negative. Rectal examination revealed a small, firm, resilient, smooth, symmetrical prostate. The right and left lobes measured 2 by 2 by 2.5 cm., and the margins were sharp; the median sulcus was shallow, and the gland movable.

The blood pressure was 135 systolic, 80 diastolic. The temperature was 98.6°F., the pulse 96, and the respirations 20.

A blood Hinton test was negative. The urine was cloudy, with a specific gravity of 1.016 and a + test for albumin; the sediment contained occasional red cells, 20 white cells and much debris per high-power field.

An intravenous pyelogram showed prompt excretion of the dye by the right kidney, which had a normal pelvis and ureter. The left kidney was absent. The bladder shadow was somewhat irregular across the dome, appearing somewhat more depressed on the right than on the left. No definite filling defect could be visualized. The bladder emptied normally. Plain films of the abdomen were negative. X-ray films of the chest were negative except for some evidence of emphysema.

On the second hospital day an operation was performed.

DIFFERENTIAL DIAGNOSIS

DR. J. DELLINGER BARNEY: The initial hematuria apparently was due to the tumor of the left renal pelvis, which was relieved by nephrectomy. The strange part of it is that the patient went without symptoms for five years and then had recurrent intermittent hematuria. That again suggests a tumor, possibly in the other kidney, bladder or ureter. It might also have been due to stone in the remaining kidney or ureter or to tuberculosis, but the latter is not likely because tuberculosis is infrequently attended with gross hematuria. The abdomen was said to have been negative, which is rather important. The statement about the prostate aroused my interest because it seems to be the description of a normal prostate, both in size and consistence. It does not say so, but I suppose that nothing was found around the prostate or at the base of the bladder to suggest a mass of some kind that involved the tissues around the bladder.

The blood pressure appears to rule out the possibility of a hematuria due to nephritis. The fact that he had a history of intermittent hematuria with only occasional red cells does not mean much because the examination might have been done during the interval.

There is no mention of a urine culture, and I should like to know whether it was done.

DR. RONALD C. SNIFFEN: The culture showed colon bacilli.

DR. BARNEY: Was it bladder urine or urine from the right ureter?

DR. SNIFFEN: It does not say.

DR. BARNEY: In other words the urine contained a few red cells. The fact that it contained 20 white cells might have been due to the fulgurations. It does not throw a great deal of light on the question.

I shall look at the x-ray films.

DR. MILFORD SCHULZ: This is the intravenous pyelogram. In this twenty-minute film you can trace the ureter down to the bladder. It is a perfectly normal ureter as regards size and course.

DR. BARNEY: The record states that the shadow of the bladder was irregular across the dome and somewhat more depressed on the right side than on the left. They are referring to this depression. One often sees that; it is of no consequence. It is often due to the fact that the lower sigmoid presses on the bladder. I cannot see, at this distance at least, any evidence of a soft-tumor shadow on the left side, unless there is something there that may be fecal matter.

On the second hospital day an operation was performed. In a case with a story like this, one would not operate on the second hospital day without doing something in the way of cystoscopic examination. It may have been done outside. Is there anything further in the record?

DR. SNIFFEN: Cystoscopy was done at the outside hospital just before entry, at which time the granular lesion was observed. He was sent in for operation.

DR. BARNEY: There are a few diagnostic possibilities to be considered. Cystoscopy at one time showed what seemed to be a papilloma at the orifice of the left ureter. When he was cystoscoped again there was an area surrounding the ureter that was red, granular and firm and covered an area 1 or 2 cm. in diameter. This does not sound like a description of a papillary tumor of the orifice of the ureter or of the bladder. If it is true that he had a papillary tumor of the left renal pelvis, one can imagine that what he had five years afterward was an implant from the papillary tumor in the pelvis into the ureter or along the course of the ureter. It may have grown more or less the length of the remaining ureter, or it may have grown just around the orifice of the ureter, or it may have been in the ureter long enough to get outside the ureter and form a tumor in the pelvic region. We not infrequently see a papillary tumor near the orifice of a ureter, or sometimes within it, and not thinking of the possibility of a kidney tumor above, we fulgurate the lesion and think that we have done our job. An intravenous or retrograde pyelogram should show whether there is a tumor in the kidney above it. If not, one is dealing with a tumor of the ureteral orifice, which is an entity in itself; whereas if there is a tumor in the kidney, it is a waste of valuable time to fulgurate the tumor at the orifice of the ureter.

I should like to know a little more about the urine from the right kidney. It is true that it secreted the dye normally, that the ureter was all right and that the kidney itself at first glance looked fairly good. It is a faint film. I should rather see a more powerful secretion of the dye. This does not look normal to me: the middle calyx is divided into two parts, and the upper calyx is slightly dilated and seems to have a somewhat different density. There is considerable density in some parts and less in other parts, and here the appearance is bifid. So I am not at all sure that something was not going on, possibly a neoplasm, in the right kidney, which would cause the hematuria. Of course, it is evident that he had, or did have, a neoplastic condition at the orifice of the left ureter. So we come down to the question whether this was a residue, so to speak, from the tumor of the renal pelvis on the left, which, after a long period of quiescence on the part of the tumor, finally started up and produced the symptoms and signs that we have been told about. If that was the case, I am surprised that there is not some mention of a mass felt by abdominal or rectal examination, or evidence in some way that there was tumor along that ureter. Nothing was apparently done to investigate the stump of the left ureter. There is nothing here to indicate that a catheter was passed into the ureter on the suspicion or chance that there might have been a papillary tumor sprinkled along its course for a greater or less distance. If that had been done we should be able to say whether there was a clean ureter with trouble at the orifice, which in itself might have been due to the tumor of the kidney pelvis that had been removed.

I also wish that a retrograde pyelogram had been done on the right kidney. We often find that an intravenous pyelogram does not give all the necessary information. There is enough suspicion aroused by the appearance of the right kidney to warrant a retrograde pyelogram. There is no evidence that this was done. Attention was focused on the orifice of the left ureter, and the patient was operated on two days after he came in.

I believe that we can rule out tuberculosis, stone and nephritis, and it therefore comes down to a tumor of the lower end of the left ureter with extrusion out into the bladder, to some growth around the ureter in that region or to some lesion in the right kidney, which, so far as I can find out, was not further investigated. My first diagnosis is residual papillary tumor of the lower end of the orifice of the left ureter and of the bladder around the orifice of the ureter. My second guess would be a pathologic lesion in the right kidney, which had not been adequately studied. The fact that the patient was operated on forty-eight hours after he came into the hospital indicates that the surgeon

felt fairly sure of the situation from the previous examinations.

DR. SNIFFEN: In the absence of one kidney, does the pelvis on the other side enlarge or is it the parenchyma alone?

DR. BARNEY: More the parenchyma than the pelvis, unless there is some obstruction in the ureter, of which I see no indication in this film.

DR. SNIFFEN: Dr. Smith, you operated on this man, would you like to tell us your findings?

DR. GEORGE G. SMITH: This patient was in perfectly good health except for recurring attacks of hematuria that were due to a papillary tumor, which had recurred always in the same place. This was in the region of the left ureteral orifice. His right kidney never troubled him and was adequately sustaining life. It seemed to me that the chief thing was to get rid of the tumor of the lower left ureter, which was presumably an implant from the original papilloma of the left kidney pelvis. He had had a tumor cut off with the resectoscope in that region fairly recently; on cystoscopy the whole region of the left ureteral orifice was elevated and looked a little peculiar. I could feel nothing by bimanual examination, but it seemed to me that he should have the stump of the ureter and the adjacent bladder wall removed. That was done. The ureter was quite long, but I was able to free it to the upper end, which was well above the pelvic brim. The ureter was filled with thin purulent fluid. It was taken out without being opened, and the bladder wall was excised by an oval incision, which I think went entirely outside the indurated area. That was sewed up, and the bladder drained by a catheter through the anterior bladder wall. The patient made an uneventful convalescence except that it took him longer to heal than we had hoped. He left the hospital on the eighteenth postoperative day.

I saw the patient yesterday, — about two months after discharge, — and he was in excellent health. The urine was infected, but he had not been on urinary antiseptics lately.

CLINICAL DIAGNOSIS

Papillary carcinoma of left ureter.

DR. BARNEY'S DIAGNOSIS

Neoplasm of left ureter, secondary to neoplasm of left renal pelvis.

ANATOMICAL DIAGNOSIS

Carcinoma (Grade IIB) of left ureter.

PATHOLOGICAL DISCUSSION

DR. SNIFFEN: Dr. Smith removed a disk of bladder about 3 cm. in diameter. In the center was the ureteral orifice and from it arose about 18 cm. of ureter. The ureter was dilated to three or four times its normal size and contained pus. In the ureter, about 1 cm. above the vesical orifice, was a tumor measuring approximately 1 cm. in diameter that completely obstructed the lumen. Several centimeters above it there were two other small tumors. Microscopic sections showed an infiltrating carcinoma of moderate malignancy. The neoplastic cells had spread to the neighboring lymphatics but not to the resected edge of the bladder.

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THE TUMULT AND THE SHOUTING

Regularly every four years, in our democracy, come famine or plenty, health or pestilence, prosperity or depression, peace or war, a certain not too imposing percentage of the electorate goes to the polls; there it exercises its constitutional privilege of selecting from its nominated peers those who will arbitrate the destinies of the Nation for another forty-eight months.

Whether the choice of the voters at this regularly ordained and politically hallowed period of emotional instability is to turn the rascals out or to put the rascals in, is almost entirely a matter of the point of view, since for every vice there must be a versa. Fortunately the organized medical profession, as such, and as represented by its society journals has the record, to date, of having held itself aloof from those party gyrations, which present no edifying spectacle at this stage of the administrative cycle.

Medicine, with no political axe to grind, although year by year it is growing more acutely conscious of its lack of such a weapon for defensive purposes, is increasingly in danger of becoming the victim of the ardent axemen of either party. Accustomed from time immemorial to minding its own business, and to being quite slow about it, it has been marked as a suitable subject for reform by those who specialize in minding other people's business, and in a hurry.

At this juncture, we congratulate the *New York State Journal of Medicine*, always the champion of medical autonomy, on an editorial in its October 2 issue in which it stresses the freedom of the medical profession from political alliances and entanglements. In this respect our profession, probably, comes closer to heeding the parting words of Washington than does any similar organization in the country, if not, indeed in the known world. This same editorial reaffirms the official commitment of the Medical Society of the State of New York to the proposition of voluntary medical-expense indemnity insurance.

A profession that goes so deeply into the lives and welfare of all the people can have no political affiliations; like the Red Cross, its functions are universal and above party considerations. Its very indispensability, however, to the Nation as a whole makes its activities and its ministrations a matter of concern to all people and all parties. If it cannot itself make its benefits universally available, then the attempt is bound to be made from without, and not well or wisely.

The scientific and the humane achievements of medicine have kept pace with the developments in other branches of human activity; its sociologic and economic aspects have been maturing more slowly, although they are making progress with the added desideratum of a sure footing. In Massachusetts, with the Blue Cross, the Blue Shield and now the Blue Triangle available, we are keeping well in the front of this economic progress, and ask only

for freedom from bungling interference by any party.

The tumult and the shouting of an election year will soon die away; may it leave in high political places, as well as in the less conspicuous ranks of medical practice, the same ancient sacrifice of "a humble and a contrite heart"!

SYNTHETIC QUININE

THE sensational medical history of cinchona and its best-known alkaloid quinine[1] is being continued in our own time by the sealing off of the foremost natural source of cinchona bark when the Netherlands East Indies were seized by the Japanese early in the present war and by a great scientific achievement — the synthetic production of quinine.

The first event can be remedied by the passage of time and the successful outcome of the war. The second event can best be appreciated by reading the scholarly paper of Haggis[1] entitled "Fundamental Errors in the Early History of Cinchona." This account illustrates the extent by which the discovery and application of a remedial plant can be obscured by the past, and the painstaking labors necessary to unravel fact from fiction. Coincident with the increasing need of quinine for the treatment of malaria and the use of quinidine, another alkaloid of the cinchona bark, for cardiac treatment, the cinchona-bark industry grew. The patience and skill acquired by the Dutch in co-ordinating horticultural practice, soil science, chemistry and forest succession for the production of cinchona bark[2] are reflected in figures given by Taylor,[3] who states that before the present war the world consumption of quinine was 722 tons annually and that before the invasion of Java, in the year 1941, the annual production was 1017 tons. In contrast to the centuries needed for the production of quinine by natural methods, the efforts of two chemists, Woodward and Doering,[4, 5] over a period of fourteen months, have culminated in the synthetic production of quinine.

Much of the publicity attendant to this achievement gave the unfortunate impression that synthetic quinine is now available and will relieve the need for other antimalarial drugs by the armed forces and that quinine is the most effective drug for prophylaxis and the production of radical cures. As a matter of fact, synthetic quinine is a scientific curiosity and is still far from being on a practical production schedule. Furthermore, the effectiveness of quinine as an antimalarial drug is far from 100 per cent. Quinine used prophylactically does not prevent infection, although it does suppress the development of clinical malaria. In treatment, an authoritative report by the League of Nations[6] states:

> The treatment of primary *P. vivax* and *P. malariae* infections with quinine in the usual doses [1 gm. daily] is followed by relapses in a proportion of individuals which may be as high as 50 per cent. . . . On the fully-developed gametocytes of *P. falciparum*, quinine has only a slight action.

An additional factor influencing the need for quinine is a recent report by the Board for the Coordination of Malarial Studies of the National Research Council,[7] which claims that quinacrine (atabrine), when administered in proper dosages, produces results in the routine suppression and treatment of malaria that are comparable to those obtainable by the use of quinine or totaquine, one of the less highly purified derivatives of cinchona bark. In fact, the board stated: "There is convincing evidence that quinacrine not only suppresses the clinical symptoms of falciparum malaria but also cures this malignant form. The evidence of a similar curative effect of quinine is not conclusive." Unfortunately, relapses of vivax malaria are not prevented by quinacrine or quinine when a course of treatment is terminated.

All in all, it seems unlikely that the ingenuity of industrial chemists will be invoked to develop a means for the commercial production of synthetic quinine, as it was for the manufacture of penicillin. This in no way detracts from the brilliant experiments of Woodward and Doering. In fact, their method for the synthesis of quinine may eventually lead to the long-sought ideal — an antimalarial drug that is 100 per cent effective. Until such time, adequate amounts of the known antimalarial drugs and skill in their administration comprise the most potent weapon in the battle against malaria.

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MASSACHUSETTS MEDICAL SOCIETY

Although the Blue Shield is operating smoothly in the vast majority of cases, it is no different from any other undertaking, in that a few misunderstandings are bound to arise. In every such instance so far, it was the lack of information that caused the trouble.

Many participating physicians do not realize that the Blue Shield is, in effect, under separate contract to subscribers whose incomes are less than $2500 for families and $2000 for individuals. These "under-income" or "unlimited" subscribers, as they are called, are entitled to the benefits of their membership without any additional charge by participating physicians.

In a few cases, the failure on the part of the physician to determine whether or not a patient is a Blue Shield member has led to the following type of misunderstanding: A patient arranges with a surgeon for an operation at an agreed fee. Later, after he is well, the patient informs the surgeon for the first time that he is a Blue Shield subscriber and that he is entitled to unlimited service because of his low-income status. The surgeon is then obliged to accept the Blue Shield payment, which may or may not be as much as the agreed fee.

Although the subscribers' contract technically protects the physician in cases of this kind by specifically requiring the subscriber to identify himself as a Blue Shield member at the time arrangements are made for the operation, very poor public relations result when the physician bills the under-income subscriber for an additional charge. Participating physicians have agreed as a matter of principle that under-income subscribers should not have to pay extra charges for surgery and after-care in the hospital.

It should be remembered, however, that the physician continues to charge his regular fee to those subscribers whose incomes are larger than the amounts stated above, and thus may quite properly bill the over-income subscriber for the amount, if any, that his fee exceeds the Blue Shield payment.

A great deal of confusion could be avoided and public relations could be immeasurably benefited if the participating physician would simply ask each patient the following two questions: Are you a Blue Shield subscriber? If so, what is your income status? The physician would not then be working in the dark, and the arrangements concerning the fee could be made with complete understanding.

DEATHS

JOHNSON — David J. Johnson, M.D., of Boston, died October 7. He was in his seventy-second year.

Dr. Johnson received his degree from Harvard Medical School in 1897. He was a member of the American Medical Association.

His widow survives.

REEVES — Marcellus Reeves, M.D., of Boston, died October 15. He was in his eighty-second year.

Dr. Reeves received his degree from Harvard Medical School in 1890. He was a member of the American Medical Association.

His widow survives.

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

COMMUNICABLE DISEASES IN MASSACHUSETTS FOR SEPTEMBER, 1944

RÉSUMÉ

DISEASES	SEPTEMBER 1944	SEPTEMBER 1943	SEVEN-YEAR MEDIAN
Anterior poliomyelitis	131	121	20
Chancroid	1	*	*
Chicken pox	132	114	105
Diphtheria	14	10	9
Dog bite	824	882	918
Dysentery, bacillary	40	23	23
German measles	30	59	22
Gonorrhea	410	430	430
Granuloma inguinale	0	*	*
Lymphogranuloma venereum	3	*	*
Malaria	36	13	3
Measles	92	189	150
Meningitis, meningococcal	12	42	5
Meningitis, Pfeiffer-bacillus	0	1	0
Meningitis, pneumococcal	0	4	†
Meningitis, staphylococcal	0	1	†
Meningitis, streptococcal	0	0	†
Meningitis, other forms	1	1	†
Meningitis, undetermined	3	11	†
Mumps	224	150	144
Pneumonia, lobar	66	114	114
Salmonella infections	16	30	16
Scarlet fever	244	397	168
Syphilis	363	482	427
Tuberculosis, pulmonary	216	188	239
Tuberculosis, other forms	12	26	23
Typhoid fever	4	2	7
Undulant fever	2	2	3
Whooping cough	286	301	474

*Made reportable in December, 1943.
†Pfeiffer-bacillus meningitis only other form reportable previous to 1941.

COMMENT

Anterior poliomyelitis continued high as compared with the seven-year median for the month of September, but at a figure far below that of epidemic years.

Diphtheria continued at too high a level. Only once since 1936 has September shown more cases. It is obvious that more children must be immunized.

Bacillary dysentery ran rather high during September — higher than during any previous month this year. Moreover, this figure has been exceeded only three times by the September figures of the last eleven years.

GEOGRAPHICAL DISTRIBUTION OF CERTAIN DISEASES

Anterior poliomyelitis was reported from: Agawam, 1; Arlington, 1; Belmont, 1; Boston, 5; Boylston, 1; Braintree, 1; Brookline, 5; Cambridge, 2; Cheshire, 1; Chicopee, 7; Dalton, 2; Danvers, 1; Deerfield, 1; East Longmeadow, 1;

Framingham, 1; Fort Devens, 2; Greenfield, 1; Hadley, 1; Hampden, 3; Hancock, 1; Hanover, 1; Haverhill, 4; Holyoke, 3; Lenox, 1; Ludlow, 4; Lynn, 1; Medford, 2; Melrose, 1; Middlefield, 1; Milton, 2; Natick, 1; Newton, 2; North Adams, 1; North Reading, 1; Northampton, 1; Oxford, 1; Pembroke, 4; Pittsfield, 7; Quincy, 2; Revere, 1; Sharon, 1; Shelburne, 1; Somerville, 2; South Hadley, 1; Southampton, 1; Southbridge, 1; Springfield, 33; Watertown, 2; West Springfield, 3; Westfield, 1; Wilbraham, 1; Williamstown, 1; Worcester, 30; total, 131.

Anthrax was reported from: Somerville, 1; total, 1.

Diphtheria was reported from: Boston, 3; Chelmsford, 1; Dracut, 1; Everett, 1; Lawrence, 1; Medford, 5; New Bedford, 1; Somerville, 1; total, 14.

Dysentery, bacillary, was reported from: Boston, 5; Cambridge, 1; Everett, 1; Lawrence, 2; Lowell, 2; Malden, 5; Marblehead, 1; Saugus, 1; Wellesley, 1; Wrentham, 1; Worcester, 20; total, 40.

Encephalitis, infectious, was reported from: Auburn, 1; Lynn, 1; Methuen, 1; total, 3.

Malaria was reported from: Boston, 5; Brookline, 1; Camp Edwards, 16; Fort Devens, 10; Haverhill, 2; Natick, 1; Woburn, 1; total, 36.

Meningitis, meningococcal, was reported from: Attleboro, 1; Boston, 4; Brockton, 1; Chicopee, 1; Dedham, 1; Easthampton, 1; Leominster, 1; Malden, 1; Quincy, 1; total, 12.

Meningitis, other forms, was reported from: Somerville, 1; total, 1.

Meningitis, undetermined, was reported from: Milford, 1; Springfield, 1; Worcester, 1; total, 3.

Salmonella infections were reported from: Attleboro, 2; Boston, 1; Fall River, 3; Malden, 3; Medford, 2; Sheffield, 1; Springfield, 1; Walpole, 1; Wellesley, 2; total, 16.

Septic sore throat was reported from: Amherst, 1; Boston, 4; Marion, 1; total, 6.

Tetanus was reported from: Boston, 1; Oakham, 1; total, 2.

Trachoma was reported from: Cambridge, 1; total, 1.

Trichinosis was reported from: Chesterfield, 1; total, 1.

Typhoid fever was reported from: Chelsea, 1; Holyoke, 1; Lynnfield, 1; Worcester, 1; total, 4.

Undulant fever was reported from: Belmont, 1; Brockton, 1; total, 2.

CONSULTATION CLINICS FOR CRIPPLED CHILDREN IN MASSACHUSETTS UNDER THE PROVISIONS OF THE SOCIAL SECURITY ACT

Clinic	Date	Clinic Consultant
Haverhill	November 1	William T. Green
Lowell	November 3	Albert H. Brewster
Salem	November 6	Paul W. Hugenberger
Brockton	November 9	George W. Van Gorder
Springfield	November 15	Garry deN. Hough, Jr.
Worcester	November 17	John W. O'Meara
Pittsfield	November 20	Frank L. Slowick
Fall River	November 27	Eugene A. McCarthy
Hyannis	November 28	Paul L. Norton

NOTICES

AMERICAN FEDERATION FOR CLINICAL RESEARCH

An all-day meeting of the Eastern Section of the American Federation for Clinical Research is being planned for December 9. Investigators desiring to read papers on clinical research should submit an abstract of not over 200 words to Dr. Orville Bailey, Harvard Medical School, 25 Shattuck Street, Boston 15, before November 15. The meeting will be held in Boston and will be open to members of the medical profession.

POSTGRADUATE CLINICS IN DERMATOLOGY AND SYPHILIS

Owing to requests for postgraduate work in dermatology and syphilology, the Department of Cutaneous Diseases and Syphilis of the Boston City Hospital will conduct weekly clinics for instruction in the diagnosis and treatment of cutaneous diseases and syphilis. All physicians are invited.

Meetings will be held in the Dowling Amphitheatre on Fridays at 10:50 a.m. during the academic year. The first meeting was held October 6, when a symposium on psoriasis was conducted.

NEW ENGLAND HOSPITAL FOR WOMEN AND CHILDREN

The monthly clinical conference and meeting of the staff of the New England Hospital for Women and Children will be held on Thursday, November 2, in the classroom of the Nurses' Residence, at 7:15 p.m. Dr. Maurice Fremont-Smith will speak on the subject "The Use and Misuse of Hormone Therapy." Dr. Anne Hopkins will be chairman.

JOSEPH H. PRATT DIAGNOSTIC HOSPITAL

Bennet Street, Boston
Lecture Hall, 9–10 a.m.

Medical Conference Program

Wednesday, November 1 — Penicillin in Venereal Disease. Dr. Oscar F. Cox.

Friday, November 3 — The Effect of Testosterone Compounds in Hyperthyroidism. Dr. Edward C. Reifenstein, Jr.

Wednesday, November 8 — Modern Anesthesia. Dr. Frank W. Marvin.

Friday, November 10 — Review of Electroencephalograms Made on Pratt Diagnostic Hospital Cases. Dr. John A. Abbott.

Tuesday, November 14 — Newer Diuretics. Dr. Werner Lipschitz.

Wednesday, November 15 — Present-Day Treatment of Hypertension. Dr. David Ayman.

Friday, November 17 — Recent Advances in Cardiology. Dr. Samuel Levine.

Wednesday, November 22 — Arterial Insufficiency in the Lower Extremities. Dr. John Homans.

Friday, November 24 — Diagnosis of Uterine Cancer by Vaginal Smear. Dr. Joe Vincent Meigs.

Wednesday, November 29 — Signs and Symptoms of Nutritional Disturbances. Motion picture film shown through the courtesy of E. R. Squibb & Sons.

On Monday mornings clinics will be given by Dr. Samuel Proger. On Saturday mornings clinics will be given by Dr. William Dameshek.

On Tuesday and Thursday mornings Dr. S. J. Thannhauser will give medical clinics on hospital cases.

SOCIETY MEETINGS AND CONFERENCES

Calendar of Boston District for the Week Beginning Thursday, November 2

Thursday, November 2

7:15 p.m. The Use and Misuse of Hormone Therapy. Dr. Maurice Fremont-Smith. New England Hospital for Women and Children.

Friday, November 3

10:50 a.m. Postgraduate clinic in dermatology and syphilis. Dowling Amphitheatre, Boston City Hospital.

Saturday, November 4

*10:00 a.m.–12:00 m. Medical staff rounds. Peter Bent Brigham Hospital.

Monday, November 6

12:00 m.–1:00 p.m. Clinicopathological conference. Peter Bent Brigham Hospital.

Tuesday, November 7

*12:15–1:15 p.m. Clinicoroentgenological conference. Peter Bent Brigham Hospital.

Wednesday, November 8

*12:00 m. Clinicopathological conference. Children's Hospital.

7:15 p.m. Graduate seminar in pediatrics. Children's Medical Service, Massachusetts General Hospital, Amphitheatre 3A.

*Open to the medical profession.

November 1–29. Joseph H. Pratt Diagnostic Hospital. Medical conference program. Notice elsewhere on this page.

November 2–4. Association of Military Surgeons. Page xiii, issue of August 17.

November 8 and 9. National Committee for Mental Hygiene. Page 570, issue of October 19.

November 9. The Clinical and Roentgenological Diagnosis of Carcinoma of the Lung. Dr. Merrill Sosman. Pentucket Association of Physicians. 8:30 p.m., Haverhill.

November 15. New England Oto-Laryngological Society. Page 508, issue of October 5.

December 9. American Federation for Clinical Research. Notice elsewhere on this page.

December 13 and January 3 to April 25. Metropolitan State Hospital. Page 508, issue of October 5.

(*Notices continued on page xvii*)